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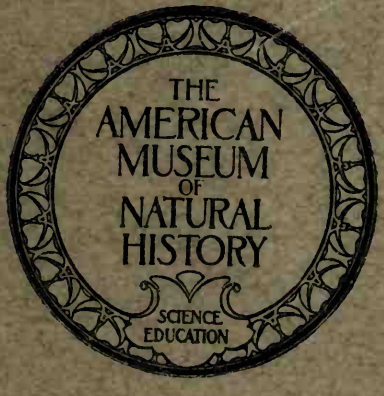
VOLUME XXXI, PART II

BASKETRY OF THE SAN CARLOS APACHE

By Helen H. Roberts



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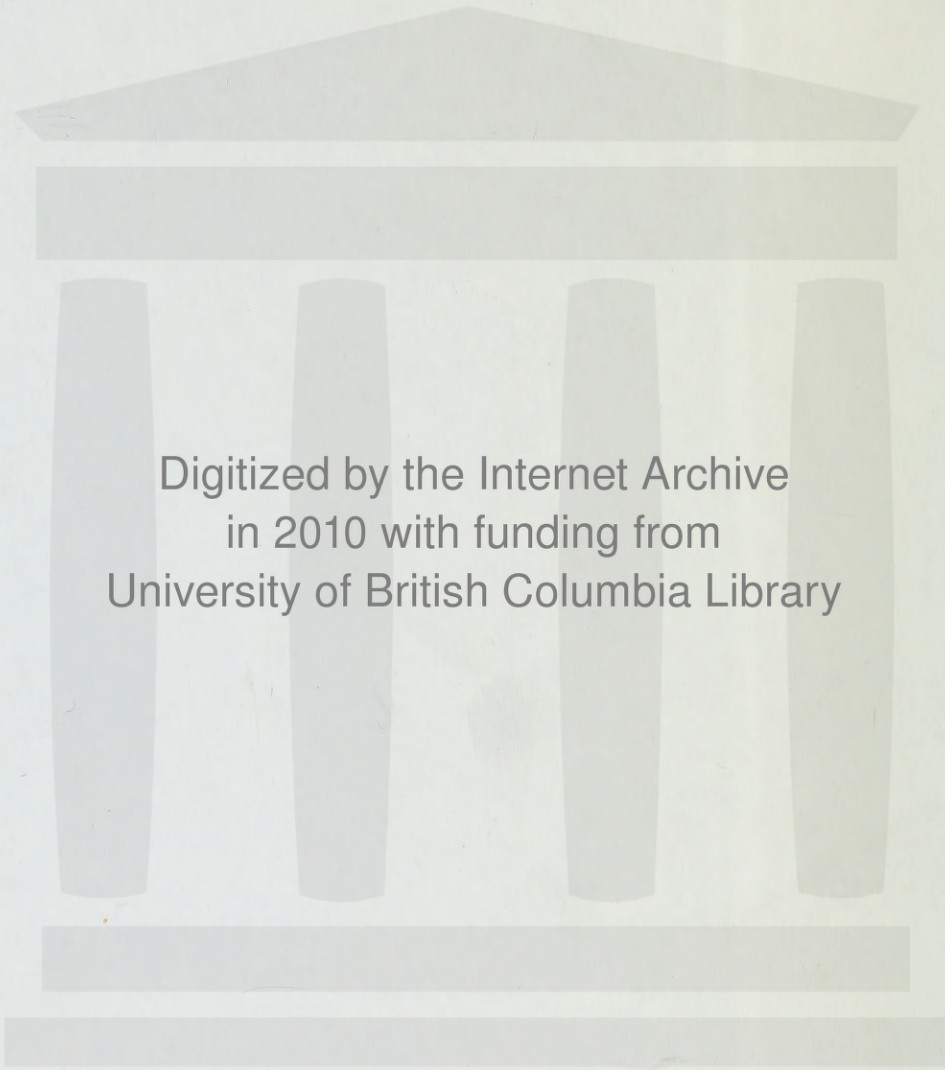
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THE BASKETRY OF THE SAN CARLOS APACHE

By Helen H. Roberts

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PREFACE

The following study of San Carlos Apache basketry is the result of many months of laboratory work during 1916–1917, based upon the extensive collection at the American Museum of Natural History, supplemented by casual work at the Field Museum of Natural History, and the United States National Museum. The resulting paper was accepted in 1918 by the American Museum for publication, but was withheld until a companion paper should be completed by the late Doctor Pliny E. Goddard.

Although fairly well acquainted with the desert life of some of the Southwestern tribes, the writer is personally unfamiliar with the San Carlos or their habitat. Where it was necessary to obtain more specific information about their life, the way in which they specially prepared their basket-making materials, the meaning of the designs employed, and the ceremonial customs in which baskets and designs play a part, second-hand information was sought, but this was of the most reliable kind. Thanks are due to Doctor Clark Wissler for his assistance in these matters and to Doctor Pliny E. Goddard, who collected many of the specimens in the field. The Apache terms were taken chiefly from Doctor Goddard's field-notes and it was his original intention to study them and rectify any errors, as well as to furnish fuller translations, but his death has prevented. However, it has been thought best to give them for what they may be worth in their present form.

Although I was not able to study extensively at the United States National Museum and the Field Museum of Natural History, the courteous assistance rendered by the staffs of these institutions, who placed their collections and time at my disposal, is acknowledged with appreciation. I am especially indebted for the fine photographs credited to these museums in this paper. The majority of the illustrations represent specimens in the American Museum of Natural History.

May, 1929

Helen H. Roberts,
Yale University.

INTRODUCTION

Since this report deals with the basketry of an area somewhat allied geographically and culturally to that of the Papago and Pima tribes, upon whose basketry Miss Mary Lois Kissell has published an authoritative and exhaustive study,[1] it was decided to treat the subject

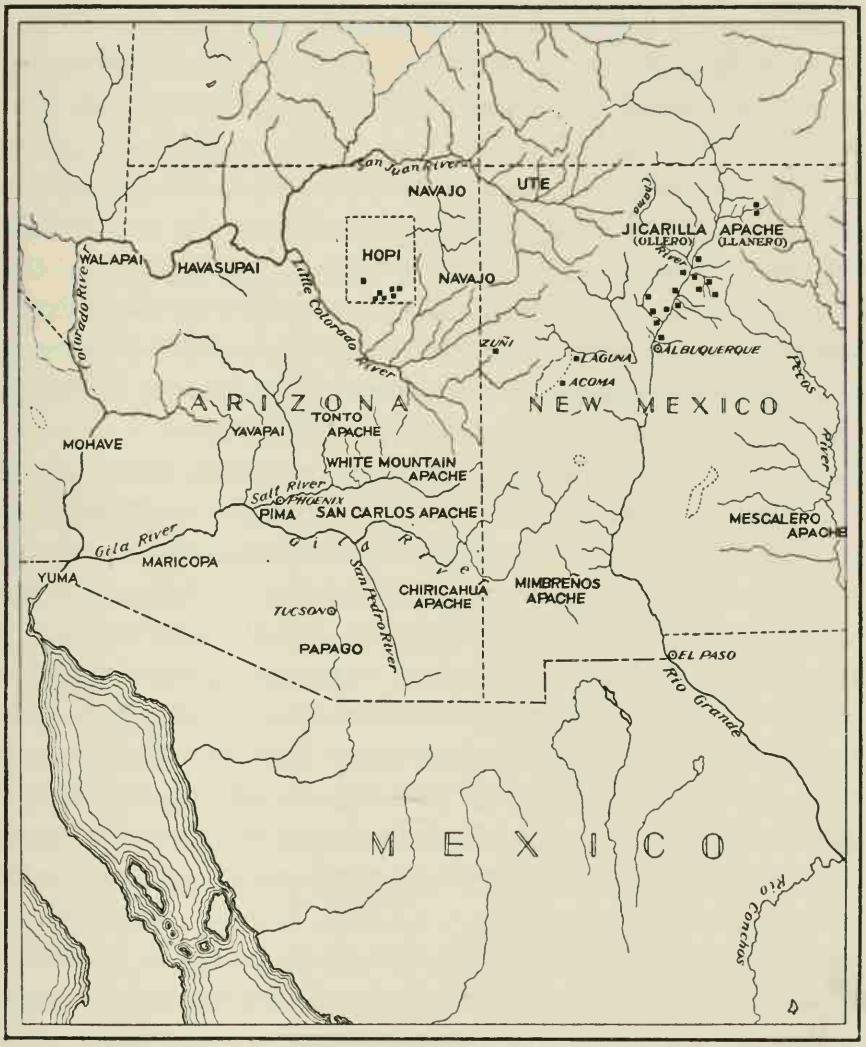

Fig. 1. Map of the Southwestern Area.

along the lines she has already followed so as to make a comparative study easier and more intelligible. It seems unnecessary to discuss again at length many points such as descriptions of country, desert or semi-desert culture, and, to a certain extent, the influence of environ-

[1] "Basketry of the Papago and Pima" (*Anthropological Papers, American Museum of Natural History*, vol. 17, part 5).

ment upon that culture, since what applies to the Papago and Pima often applies equally well to the San Carlos and other more northerly tribes. (For geographical location see the map, Fig. 1). Miss Kissell's paper will be cited frequently, the above reasons being a sufficient explanation.

In some respects, however, the Papago and Pima differ from the people about to be discussed. They build more stable dwellings, apparently, and in many ways exhibit more sedentary habits. They are well acquainted with a variety of basketry techniques, manufacturing plaited articles,—mats, baskets, and rings for supporting water jars,—as well as twined and coiled baskets of several kinds, including the lace-coiled burden baskets. In many respects the baskets of the Papago and Pima are much alike. Miss Kissell has discussed the more subtle differences.[1]

The San Carlos, on the contrary, from the collections of their work which I have studied, seem to restrict themselves to the ordinary types of twined and coiled baskets, a little wickerwork on baby carriers, and to latticework in constructing the bottoms of these and for holding together the frames and branches which constitute their houses.

The foundation coiled ware of the entire region stretching from the Colorado River eastward into New Mexico and southward into Old Mexico to include the Papago and Pima presents a certain gross resemblance, but there are also local styles due in part to variations in technique, but chiefly to differences in designs and color. The resemblance, which seems more marked in a cursory survey than it really is, is to be attributed mostly to the technique as contrasted with twined or plaited baskets, and to the rather coarse coils, of which the rim coil is more often dark colored. Another striking similarity arises from the wide use of the black *Martynia*, usually as a design material, contrasted with lighter, straw-colored backgrounds of cottonwood, willow, mulberry, or sumac.

The coiled work of the Papago and Pima, however, is different from that of the San Carlos and some other northern tribes which make similar basketry, not only in the matter of designs, but in having a multiple foundation coil, consisting of finely shredded material instead of three rods. The Papago and Pima also occasionally begin their baskets by plaiting a small square for the center of the bottom, (a fashion which I have not noted in the basketry of the more northern tribes whose coiled work I investigated), but they also and more often use the same method of starting a coil which is found generally in the Southwest. The differ-

[1] *Op. cit.*, 249 ff.

ences in forms will be discussed in a later section (p. 166) as well as those of design (pp. 140, 175, ff.).

Although the present paper is devoted to a detailed study of San Carlos basketry, it will be advantageous to refer, as occasion arises, to the products of some other tribes north and west of them, who are not all Apache, nor have they all exactly the same kind of culture. But as has already been remarked, their baskets are very similar to those of the San Carlos, and it is to their decoration by designs, rather than to their principles of structure, or even of materials, that one must look chiefly for tribal peculiarities. There is some difference in the materials employed, at times, but the cottonwood, willow, and the pleasantly contrasting *Martynia* are so widely distributed over this general region and so suitable for basketry, that they tend to predominate in the work of all these tribes. The work of the White Mountain Apache, who live only a little north of the San Carlos, most closely resembles that of the latter tribe. The baskets of the Chemehuevi (a Shoshonean group living a considerable distance to the west, who are not Apache although sometimes classed as such) are like them in practically all features except designs. It will be necessary to refer also to the Walapai, the Havasupai, the Palomas, who are Yuman, and to the Mescalero Apache.

On the whole, all these tribes used a three-rod coil foundation, although the multiple foundation was known, particularly to the Mescalero who used it at times in a manner similar to the Papago and Pima, for the entire basket, whereas the other tribes employed it in the rims of baskets woven in quite a different technique, namely, twined ware, which was characteristic of water jars and burden baskets. The coiled work seems to have been restricted by most of these tribes to bowls, plates, trays and the like. The foundation rods are laid in clover-leaf formation, resulting in nearly round, hard coils, giving the walls of the baskets deeply corrugated surfaces both outside and inside. Baskets made with this kind of coil are extremely rigid and withstand years of hard wear. Multiple foundation coils are more like ribbons or ropes, producing smoother, less corrugated walls and more flexible baskets which also seem less durable, although this is not necessarily the case.[1]

Since the three-rod foundation type of baskets has been unearthed at Grand Gulch, Utah, from cliff-dweller ruins, and is typical of the Basket Maker products, it may be assumed that the type is old and probably spread over the region at an early date, the baskets developing local styles in design with the passage of time, not only be-

[1]Kissell, *op. cit.*, 250–251.

cause of the cultural differences of their makers, but because of local variations of vegetation supplying the materials for making them.

The San Carlos, White Mountain, Chemehuevi, and Palomas produce coiled work so much alike that were it not for the designs and the finish of the rim coil it would be practically impossible to distinguish the products of the different tribes. The Chemehuevi and Palomas generally finish their basket rims with an overcasting stitch executed at a pronounced slant as it crossed the coil, while the San Carlos and White Mountain tribes place their stitches over the coil at right angles to its direction. The White Mountain Apache, although making baskets for the most part indistinguishable from those of the San Carlos, nevertheless seem to be less finished craftswomen. Formerly for the sewing material they used mulberry splints extensively which have weathered to a warm gray color in their old baskets. At one time, during a temporary religious ardor, they introduced the cross and crescent as basket designs; these were later carried south to the San Carlos and subsequently also incorporated in their stock of design elements.

The Walapai, Mescalero, and the Havasupai, to some extent, used a very fine false-braid stitch for finishing the rims of their baskets, and the Havasupai made twined ware bowls as well as coiled ones. The Navajo, who are somewhat removed from these tribes, also made three-rod foundation coiled basket bowls, but wove them rather more coarsely and unevenly. They used the same fine false-braid rim stitch as the Walapai, Mescalero, and Havasupai, and so did the Ute. Local variations appear chiefly in differences of sewing material, length of stitches, tautness of work, etc., but the stitch is the same and is distributed even more widely geographically. It is found on some of the coiled basket rims made by the tribes in British Columbia, while to the south, among the Papago and Pima, it is quite common. It was never found by me on San Carlos coiled ware, although it appears to have been used by them rather freely on the rims of twined water jars which had multiple coil-foundations. This rather odd distinction will be mentioned again.

The Navajo coiled baskets may be dismissed from this discussion with the additional remarks that besides being coarse and uneven, with braid-stitch rims, somewhat different materials and designs are used and the patterns are often executed in a faded red.

It is possible to differentiate more or less clearly the coiled basketry of the San Carlos, White Mountain, Chemehuevi, and Palomas, for though it is very similar in technique and materials, it is, for the three groups, San Carlos-White Mountain, Chemehuevi, and Palomas, rather

well differentiated in the treatment of designs. But in order to make such a comparison clear to the reader it is necessary to deal first with San Carlos basketry in detail. I have ventured to bring into notice here in advance the work of these various other tribes for several reasons. The first is that this paper is a companion paper to that of Miss Kissell, but omits much because she has already given it so well and what she has said is in many cases perfectly applicable to the San Carlos. It seemed essential to point out, however, that there are some important differences between the Papago-Pima group and a group to the north and west, of which the San Carlos is but one tribe, and that the basketry of this northern group has many general features which make it seem superficially rather uniform, but that nevertheless several sub-groups of coiled ware may be distinguished chiefly on the basis of design treatment, of which the San Carlos-White Mountain group is one. At the time this study was made and the paper written (1918) the San Carlos were represented by collections far superior in number and variety to the White Mountain, in the museums visited, so that the report became a study of San Carlos basketry almost exclusively.

In this introduction I have given more attention to the coiled ware than to the twined because not only is it the most conspicuous and perhaps the most typical basketry technique in this region, but because the differences are not so definable in the twined work, which is also on the whole more crudely executed, though there are many exceptions to this statement.

The fact that coiled ware is very widely diffused, far beyond the area mentioned here, and that it is evident that it has existed long in the Southwest, does not necessarily prove that other techniques are later developments. The twined burden basket, simple as it is, is a very old utensil too, and twined ware has probably as wide a distribution as coiled ware. Coiled work seems never to have been used for burden baskets in this region of the Southwest, with the exception of the lace coil, which lacks the foundation structure. The greater apparent popularity of the coiled forms may be partly attributable to the wider possibilities for attractive decoration which the technique and the forms have provided.

In the following discussion of San Carlos work, the twined baskets, which with them are on the whole more crude, are treated first; the coiled ware, which is the flower of their art, last.

HABITAT

The San Carlos Indians are now (1918) living along the main stream and nearer branches of the Gila River to the east of the city of Phœnix, Arizona (see Fig. 1). Their closest tribal neighbors to the west are the Pima, while far to the south, extending into Mexico, lies the region inhabited by the Papago. All of that section of the country occupied by these people is semi-arid and rather barren. In the valleys along the streams, the fertile soil yields a fairly luxurious green growth, most soothing to the eye weary of the glare of hot sunshine and the almost bare earth of the neighboring low-lying hills which are covered only sparsely with scrubby, stiff, and thorny vegetation. Here certainly little seems to be growing which to the white man would seem pliable enough even to be considered as possible basket material. Yet some of it is obtained from these plants, among which are the piñon and yucca.

Along the wide, erosion-scarred beds of streams which, during part of the year at least, are much reduced in volume, within easy reach of the water is usually a fringe of cottonwoods, willows, mulberry, and mesquite of which the young saplings furnish the necessary splints. Although the valleys in this region are grateful spots of green, and their trees afford welcome shade, they present little to suggest the Corot landscapes created by the great and beautiful trees of the same family to be found on the tablelands of Old and New Mexico along those limpid streams fed by snows which most of the year crown the not distant peaks.

But the American Indian is nothing if not the embodiment of perseverance and the things of beauty evolved by the deft fingers of these simple women of the Southwest from the scanty, and, to us, uninspiring materials, challenge that much the more our spontaneous and wholehearted admiration. Basketry with some of them has attained a high degree of perfection, even judged by European standards. It is not as exquisitely fine and delicate as the Pomo basketry of California or those twined specimens from the Aleutian Islands and North Pacific Coast, but the workmanship, considering the materials employed, can hardly be excelled. The clear-cut, beautifully balanced designs stand out perfectly because they are generally wrought in black on a cream background. Those executed on the round bowls and scutelliform baskets, from a short distance remind one of flowers, pinwheels, or rose windows. To the writer however, they call to mind especially a series of photographs of magnified snowflakes lying on black velvet, which once seen, could never be forgotten. It is only necessary to summon an optical

illusion, to reverse background and design, with a result no less pleasing than the reality.

One wonders if the Indian woman of the semi-desert country unconsciously fosters in her soul all the love of beauty of luxurious growth which is so little satisfied in these regions, and to which nature can respond only at infrequent periods when the rains may cause the barren stretches to burst into paradises of bloom. So stolid-looking and apparently unimaginative are these hard-working women, that it is difficult to believe that they are capable of conjuring from their meager supplies beautiful bits of handiwork which win for them as much as fifty dollars a specimen from the eager tourist. How did they learn to weave so deftly, their artistic and often intricate designs?

Each generation of daughters learns from the mothers and grandmothers how to make the much-used basket utensils. After having mastered the technique sufficiently to justify more particular undertakings, the young women can begin to manufacture for the tourist trade, if they choose, but it is the old women (sometimes they are blind) whose work is most prized. Undoubtedly, of late years the demand has largely created the supply of specimens showing superior workmanship as well as striking designs, a host of which are ultra-modern and utterly lacking in symbolism. These are human and animal figures, which always seem to attract immediate attention. They are in no sense historical and although a story often accompanies them, it seldom bears any intimate relation to the true mythology or life of the tribe. Such attempts at realism have crept in quite recently and their interpretations are usually "manufactured." Restricted in outline as such figures are by the medium of expression employed, really good results are rarely achieved.

The suspicion that basketry is a very old art with these people is confirmed by the high standard of perfection set at the present time (1918) by the best workers, by the number of really old specimens which are frequently finely made, by the existence of several types of baskets, various methods of weaving and many different forms adapted to the numerous uses to which the receptacles are put. Due to the ready decay of the basket fiber and the flimsy character of Apache homes, however, it would be exceedingly difficult to discover its age in the San Carlos region.

The ancient specimens of coiled ware which have been unearthed in some of the oldest ruins of the Southwest and which have been well preserved by the dryness of the atmosphere, are responsible for the term Basket Maker which is applied to their creators and their culture. Age

and contact with the fire or hot coals placed in them for the purpose of parching corn or cooking food have often completely blackened these old and valuable relics. However fascinating it would be to discuss here the probable history of the art, if it were sufficiently known to justify this, it would be out of place at this point. The subject rightfully demanding attention is concerned with the particular phases of the industry among the San Carlos, the materials available, and their preparation.

GATHERING AND PREPARATION OF MATERIALS

Tools

The principal tools are the knife and the awl. The awl was formerly made of a sharpened bone, but, since the appearance of the trader, steel awls set in wooden handles are much used. The knives, too, are of steel where formerly stone blades served the purpose.

In caulking, brushes and strainers made of bunches of stiff yucca fiber are necessary. The bunches used for strainers are thinner and the fibers are arranged more like fan sticks than those intended for brushes. With these few implements the woman's supply is complete.

Materials

Suitable fibers grow more abundantly in the eastern Gila River region than to the west or south in the Papago country, but their gathering and preparation entails not a little labor. Generations of experimenting have taught the people what shrubs can be utilized and how to treat them to obtain the desired results. The San Carlos do not use grass, but only the shoots of shrubs and young trees, a fact which accounts for the comparative rigidity of their products.

They have a certain preference for materials according to the type of basket to be made. For water jars, executed in twined weaving, a variety of sumac, *Rhus trilobata*,[1] probably, is sometimes selected, but more often the shoots of the squawberry or squaw huckleberry (*Vaccineum stamineum*) are chosen, since they are tougher and more pliable. Charles L. Owen[2] says that crude water jars for household use are all twined from such roughly prepared material as the squawberry which the White Mountain Apache call the "never-break bush." These are gathered in the spring when the sap is running, because then they are softer and those osiers requiring it are more easily stripped of their bark.

The sumac osiers are cut in one-meter lengths or thereabout, and roughly cleared of twigs, except the little ones at the top, which for some unknown reason are left on even when the basket is being woven, and are only cut when it is finished. The bark is allowed to remain. When used for the warp, the osiers are left in the condition in which they are gathered, being merely dampened to keep them flexible. Since few of the twined jars are a meter in height, the warps are of more than ample length. The osiers are about three millimeters in thickness at the point of cutting from the tree and taper down to very fine ends. They are gathered into

[1]Mason, O. T., *Aboriginal American Basketry* (London, 1905), Coville, 36.
[2]Field Museum. Personal communication.

bunches of twenty or more and wound about by pieces of tough grass. (See Fig. 2 for basketry materials.)

The squawberry osiers are smaller, perhaps two millimeters thick at the largest end and are about seventy centimeters long. There are thirty

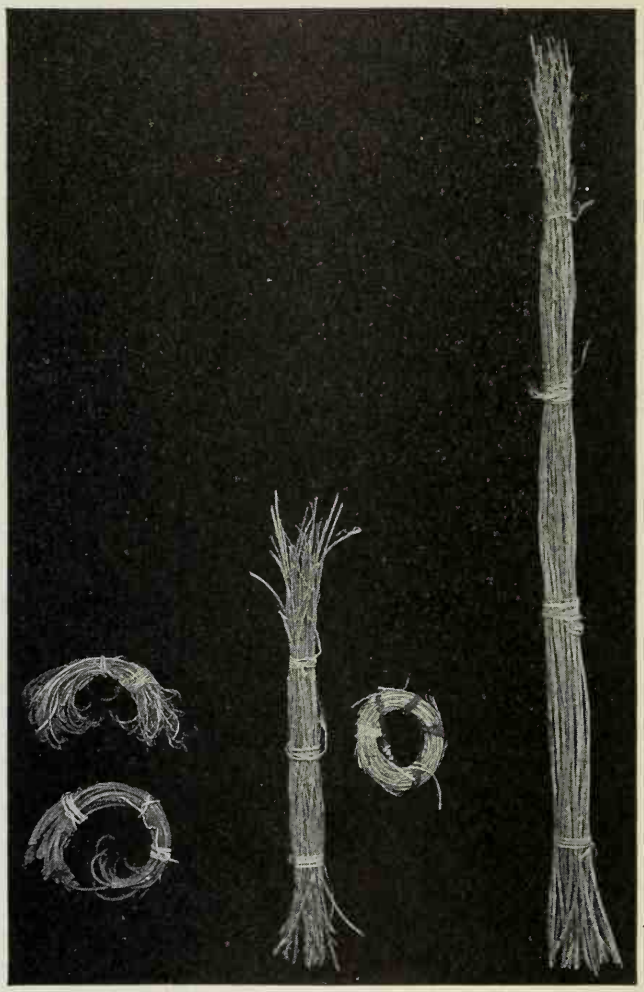

Fig. 2. Basketry Materials of the White Mountain Apache. *a*, *b*, Splints of Martynia; *c*, Shoots of squawberry; *d*, Splints of squawberry, split and denuded of bark; *e*, Shoots of the sour shrub (*Rhus*) used for weaving of water jars. *By Courtesy of the Field Museum of Natural History.*

or forty in a bunch and they are tied like the sumac. Little twigs are also left on their ends.

In addition to being used as warps, the osiers serve for twining material, but in this case the twigs are removed from the ends and the

osiers are split lengthwise into three parts without stripping the bark. The pith is scraped away rendering the splints more flexible as well as thin. In weaving, the bark side of the splints is kept innermost. As all water jars are deep and have narrow orifices, the appearance of the wrong side or inside does not matter, especially as the baskets are coated with pitch.

For burden baskets, also twined, a larger range of materials is used. Sumac, cottonwood, willow, and mulberry are all employed, the first least frequently, the latter only on the finest specimens. Squawberry does not seem to have been popular. The sumac baskets are woven with the bark left on the splints because it is so fine and thin and its red color is attractive. The mulberry (*Morus sp.*) was apparently more in demand years ago not only for the burden baskets, but as a general sewing material for all types of weaving. The White Mountain Apache used it almost exclusively, but at the present time (1918) its use is confined to the finer burden baskets. Mulberry shoots are split in the same way as those of other wood, after the bark has been removed and the sap wood carefully scraped away. They are a rich golden brown with a satiny sheen. Baskets made of mulberry are somewhat more flexible than those of cottonwood or willow. Being special products they lack the vertical side ribs of heavy sticks which are customarily crossed at right angles under the bottoms of burden baskets intended for ordinary uses, and which, by being bent upward and incorporated with or fastened to the walls of the basket as it is made, lend it strength and rigidity.

For ordinary products cottonwood and willow have supplanted mulberry. Perhaps these are considered more durable, although Miss Kissell states that the cottonwood is less so than the willow.[1] Old mulberry coiled baskets have withstood years of constant use as food bowls, cooking baskets, etc., and are now as hard as boards, ringing like pottery when struck on the table. This may be partly due to the fact that the interstices between the stitches are filled with the grease of many stews, although the baskets have been scrubbed until the golden brown has weathered to a dull warm gray. The osiers of cottonwood, willow, and mulberry are cut and tied in about the same way as the sumac and squawberry, although they are finer in cross-section. When peeled of bark and nicely smoothed they are sometimes coiled into rings.

For coiled ware sumac is rarely used. There are a few specimens, not actually proved to be of San Carlos origin, which are made of this material, but it is ordinarily too coarse. Cottonwood[2] and willow[3] are

[1] *Op. cit.*, 199.

[2] Both Miss Kissell and Frederic V. Coville, who contributed the chapter on plants in Mason's *Aboriginal American Basketry*, analyze the variety as *Populus fremontii*.

[3] Doctor Coville says (p. 37) that this is the *Salix lasiandra;* Miss Kissell identifies it as the *Salix nigra*.

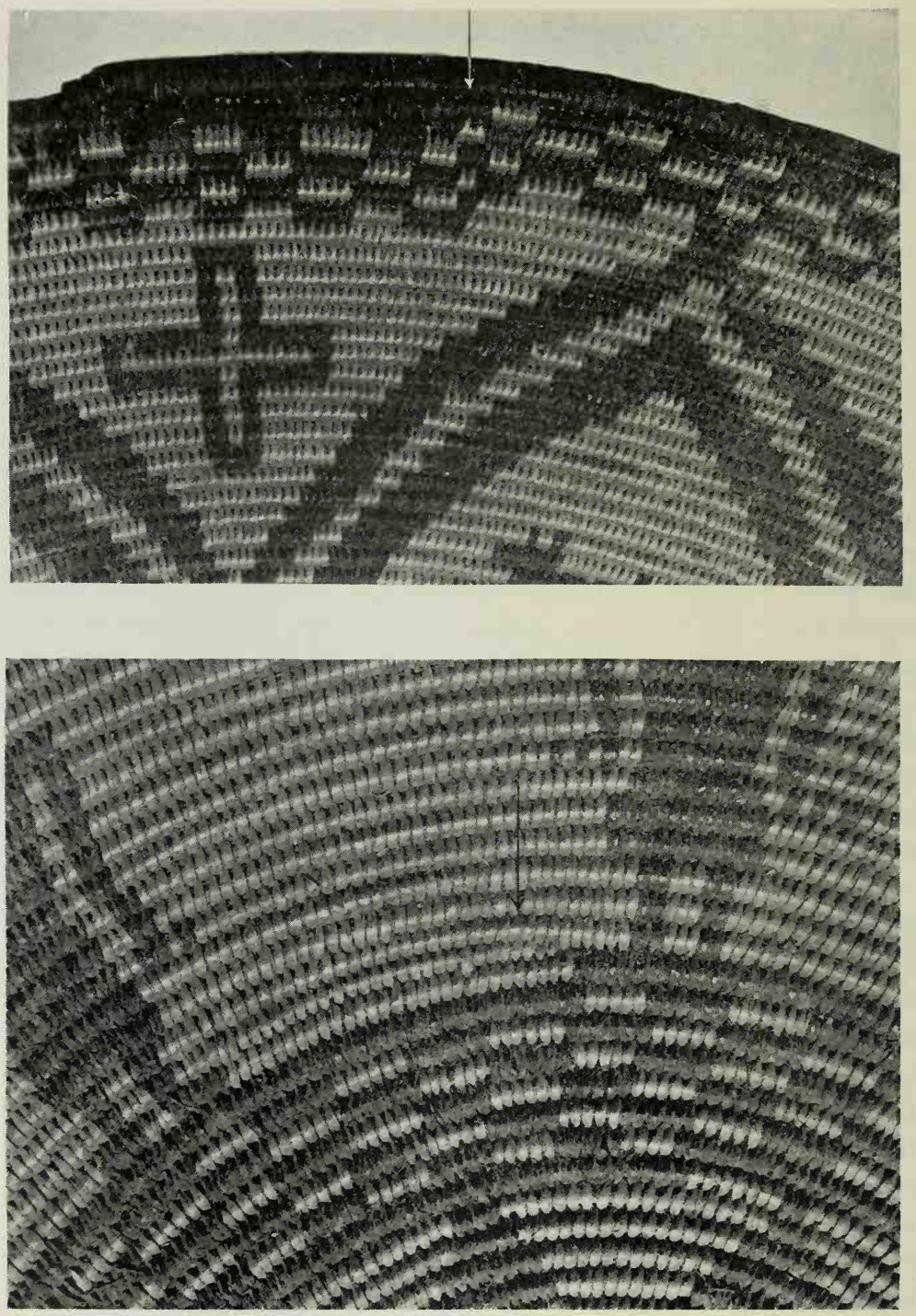

Fig. 3 (50–9035). Details of a San Carlos Double-Coiled Basket. Lower, Beginning of double coil; Upper, End of double coil. Reproduced from the *American Anthropologist*, n.s. vol. 18, Pl. XXVII.

the staple materials, and these are found along the streams in reasonable abundance. The cottonwood, *Populus fremontii*, is known to the Indians as *tes*, according to Doctor Hrdlička;[1] Doctor Goddard, who devoted many years to the study of the language, writes it *t'is*. The willow, one or more varieties of *Salix*, is called *ka-jih* or *k'ailtu*. In explanation of the fact that Miss Kissell and Doctor Coville differ in their identification of

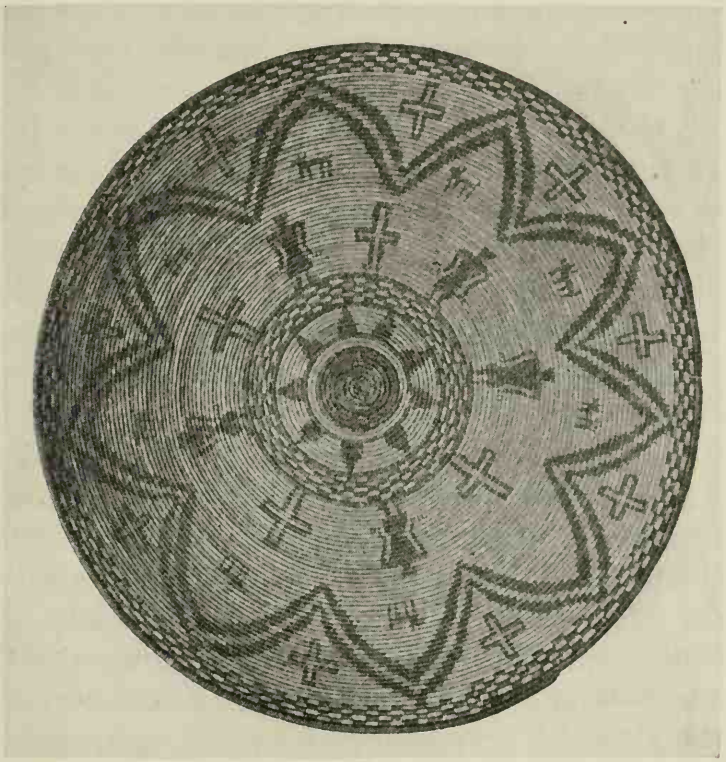

Fig. 4 (50–9035). San Carlos Double-Coiled Tray. Design interpretations: "cross," "dog," "Indian." Reproduced from the *American Anthropologist*, n.s. vol. 18, Fig. 78.

the willows, there actually do seem to be two varieties growing in the region. One is considerably darker than the other, as may be easily seen in some baskets collected for the Museum by J. Douglas some years ago in which the yellow is much deeper, the satiny sheen of the sewing splints more lustrous. It is practically impossible to distinguish the different willows except when they are in flower. One basket collected by Doctor Goddard is mentioned in his notes as being woven of red willow,

[1]Hrdlička, Aleš, "Notes on San Carlos Apache," (*American Anthropologist*, n. s. vol. 7, 480–495, 1905).

or to give the Indian name, *k'ailtu.* The Indians distinguish the species, probably, seeing their differences during blossoming time and remembering their location. The basket made of this red species does not seem different from those of the dark willow, perhaps the *nigra* mentioned by Miss Kissell. (See Figs. 3 and 4).

In this darker material the withes are not so finely split as when the lighter variety is used, with the result that the work appears coarser, but the sewing is as perfect as in finer specimens and the whole effect is regular and pleasing, the stitches resembling nothing so much as the shining kernels on a fine ear of Golden Bantam corn.

The cottonwood differs from the willow in that it is whiter and duller, a contrast which comes out strikingly in baskets started in one material and completed with the other. With these two light woods growing in fairly reasonable abundance, a marked difference results between the aspect of the basketry of the San Carlos and that of the Pima and Papago, for with the latter light woods are scarce indeed and to procure a sufficient quantity even for designs means a long search or importation by trading. Consequently, the whole effect of the work of the two southern tribes is darker, for the designs, if black, are executed in large masses and appear heavy and bold; but black is also frequently used for backgrounds, the designs, which are likely then to be small, being wrought in white. The San Carlos use cottonwood and willow osiers both for foundation rods and for sewing material; in either case they are carefully scraped of bark when freshly gathered. The description of the preparation, which follows, is general, and applies to most of the light materials which may be used for coiled basketry. The willow and cottonwood shoots are selected with great care for pliability and smoothness, and, according to the purpose for which they are intended, are treated differently. If they are to be used as foundation rods, great care is taken to select those of the same diameter, as uniform as possible throughout their length. They are usually one to two millimeters thick and about one meter long, but many are much shorter. After having been scraped or peeled free of bark and all imperfections, thirty or more are bunched and wound spirally from end to end with a tough bit of grass and these bunches are exchanged, sold, or stored until needed.

If the withes are to be used as sewing splints, the ends which have been cut from the tree are divided into three parts with the knife; one part is taken in the teeth, the other two in either hand, and pulled apart until the whole shoot is split.[1] The sap wood is removed by scraping

[1]P. E. Goddard, American Museum of Natural History.

with a knife or sharp edged stone, and the inner surface of the splint is smoothed. Great care is taken to split the splints so that they will be the same width and any irregularities are carefully corrected by scraping and paring. The prepared splints are then wound into coils about fifteen to twenty-three centimeters acrossand three to five centimeters in diameter. The bark scrapings are often saved by the thrifty San Carlos woman to be used for foundation material for the rims of rough twined water jars, pressed into service at home.

On account of its importance as a contrasting material, the black devil's claw is greatly prized. It is commonly known also as cat's claw, botanically as the *Martynia*. Doctor Coville assigns it to the species *louisiana*, Miss Kissell to the *proboscidea*. According to Hrdlička, the San Carlos call it *ce gol sha ha*, or as Doctor Goddard writes it, *tsi gol ca xa*. The San Carlos do not cultivate the plant, as do some other tribes, for it is plentiful in their country in its wild state. The *proboscidea* derives its name from the type of pod which the plant bears in the fall. At the end of each pod are two long curved hooks, varying from twenty to thirty-five centimeters in length, ending in a sharp point. When freshly cut and dried, these hooks, which are used for sewing material, are a dull rich black. They acquire a slight polish from use but finally fade to a dark gray-brown, especially after much washing and scrubbing. These extremely tough thorny hooks are also split lengthwise and because of the toughness of their fiber furnish satisfactory sewing threads which withstand years of hard usage. The wood is very close-grained, which makes its penetration, even by anything as fine as a pin point, a difficult matter. In addition to its practically universal employment in the execution of designs by the Southwestern tribes, it is also used for overcasting the rims, the devil's claw finish on this part of the basket being one of the most conspicuous, if not exclusive, features of Southern Apache coiled products. It is especially noticeable in San Carlos specimens, although not of invariable occurrence. Split withes of this material still retain their curved and twisted form. It is impossible to straighten them out, so they are merely gathered in a bunch of two or three dozen, arranged in order, and tied about the middle by a grass stem. In this state they are stored for future use. (See Fig. 2).

Occasionally modern baskets, made principally for the tourist trade, display a touch of red introduced into the color scheme of black and cream with telling and delightful effect. The material which furnishes this bit of dashing color is the root of the yucca. Miss Kissell gives it botanically as the *Yucca elata*. Another variety is the *baccata*. The

Indian term, according to Doctor Hrdlička[1], is *bi-ca-ah-te* and he describes it as brownish, but all that I have noted is a rich, flat red, sometimes deepening to maroon. It seems to combine the toughness of the *Martynia* with an even finer grain and takes a polish like mahogany.

Doctor Hrdlička gives an account of the preparation of materials which it may be well to quote here. He says the women make all of the baskets.

> Basket-making is taught to a girl by her grandmother or mother from the time she is five or six years of age. She is first given young plants of the *e-ka-ie co-še*, a yucca (the spiny points of which are chewed off in order that they may not hurt her), the leaves of which she learns to interweave. The first style of basket that a young girl learns to make is the *tha tca* (burden basket). Coiled basketry, intended for sale, she does not learn to weave until quite grown.[2]

While coiled baskets may be made largely for trade, many specimens are used by the San Carlos themselves. Practically all the old baskets are coiled and nearly all are bowls or scutelliform. The olla, or water-jar form, has come in with recent times, that is, in its perfected form. Doctor Hrdlička states that jar shapes are all coiled; and it is hard to see how he has overlooked the twined water jars which, if not of such perfect form as the coiled modern jars, are to be had in abundance. Their technique is less obvious because they are covered with pitch. Even an old coiled jar may be pitched after its best days are over. Doctor Hrdlička continues:—

> The old San Carlos women say they always made some decorated baskets for use in the household, but the fine work, as well as several of the shapes, originated with the demands of trade. . . .
>
> The osiers used in basketry are principally of the willow (*ka-jih*) and cottonwood (*tes*). The shoots are cut in winter and made into bunches of 15 to 20 by the women; these bunches are eventually bent into broad rings, placed in a pot, and slightly boiled in order that they may be easily peeled by the fingers occasionally aided by the teeth. They are then split with the teeth, and the flat outer splints placed in bunches of 30 or 40, are washed thoroughly in cold water, dried in the sun and stored for future use. The brownish red yucca root called *bi-ka-ah-te* is used only occasionally in basketry. The catsclaw (*ce-gol-sha-ha*) osiers are not boiled, but after having been softened in water are split in the same way as the willow sticks and are likewise tied in small bunches until needed.[3]

In addition to these vegetable materials strips and patches of rawhide appear on the carryall or burden basket. The strips are used as sewing materials for overcasting rims in the same manner as withes or splints while to reinforce places subjected to much wear,—such as bot-

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[1] *Op. cit.*
[2] Hrdlička, *op. cit.*, 485.
[3] Hrdlička, *op. cit.*, 485, 486.

toms,—patches of rawhide or even of tanned leather are applied. Rawhide fringe is also used for ornament.

As early as sixty years ago, heavy ticking was recognized as useful material for strengthening the bottoms of burden baskets, but when not obtainable, bright calicoes or canvas have been substituted, and sewed to the outside in large patches, by means of rawhide thongs, tough grass, or the usual sewing splints.

Fig. 5*b–c* gives an idea of the attempts to beautify even such ugly necessities as patch bottoms by cutting the edges into cog-shaped scallops. All burden baskets are provided with carrying straps of leather, ticking, or rope.

The pitch of the piñon tree (*Pinus edulis*) or in San Carlos language *dje*, is used for water-proofing twined jar shapes. On the older specimens beads, silver buttons, etc. were stuck into it for decoration, immediately after its application while it was still soft. As an aid in water-proofing, pounded juniper leaves and red ocher were sometimes rubbed into the crevices before the pitch was applied; occasionally, designs in black paint were laid on, the pitch serving as a transparent and quite durable varnish through which the colors could be seen.

Native and commercial dyes play some part in coloring splints which are woven to create horizontal banded designs on many burden baskets. On some the splints are dyed before being used, on others each stitch is painted on the outside after the basket is completed.

Among the native dyes and paints the only one which has been identified as a real dye is one made from the *ci* plant. It gives a bright but soft red which the people call *tes cih*. Red and yellow ocher are used as paints, particularly on rawhide which is tinted slightly by being rubbed with it.

The commercial dyes are a very ugly red and green which fade rapidly. A brilliant Prussian blue paint is also used. Only the reds are employed commonly. The green is seldom seen, which may be accounted for by the fact that it fades so rapidly. Where designs are painted on, it is remarkable how neatly the designs work out where they are joined after a circuit of the basket is completed. Often no adjustment is necessary although occasionally the final unit in the series is larger or smaller than the others. It is doubtful whether any previous mathematical calculation of more than casual significance is made; and certainly there is no counting of stitches. Where devil's claw is used in connection with color, one usually finds that the withes have been dyed beforehand, for painted designs generally occur on baskets which have no black. It is

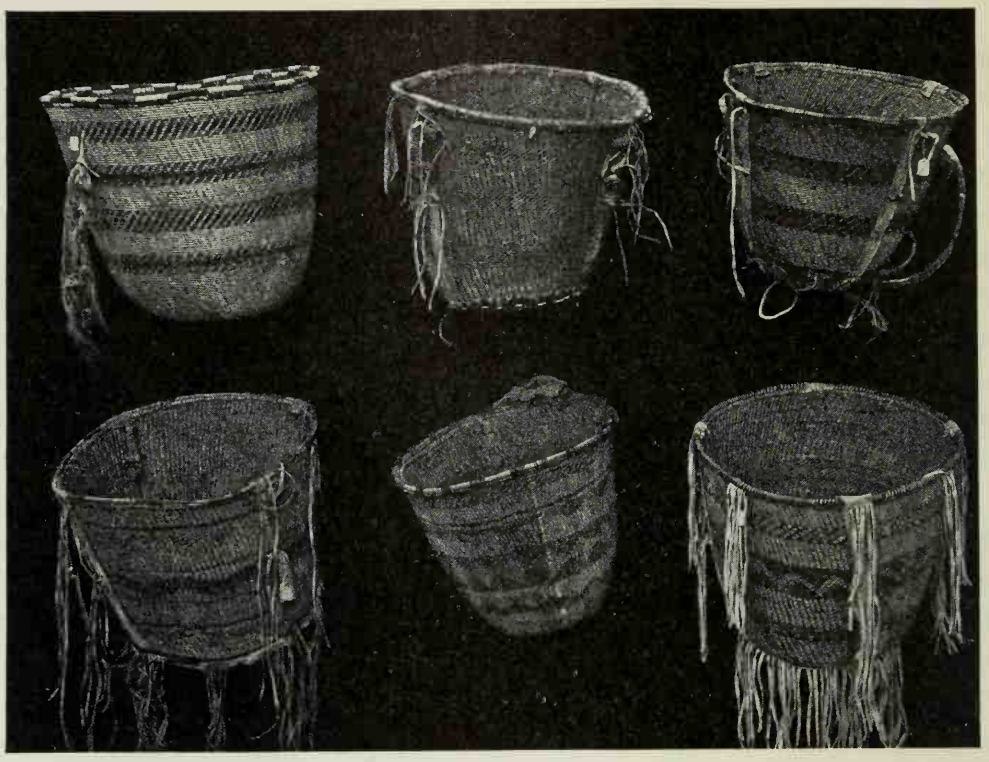

Fig. 5*a–f* (50–8682, 8823, 8768, 8746, 8787, 8677). San Carlos Twined Weave Burden Baskets.

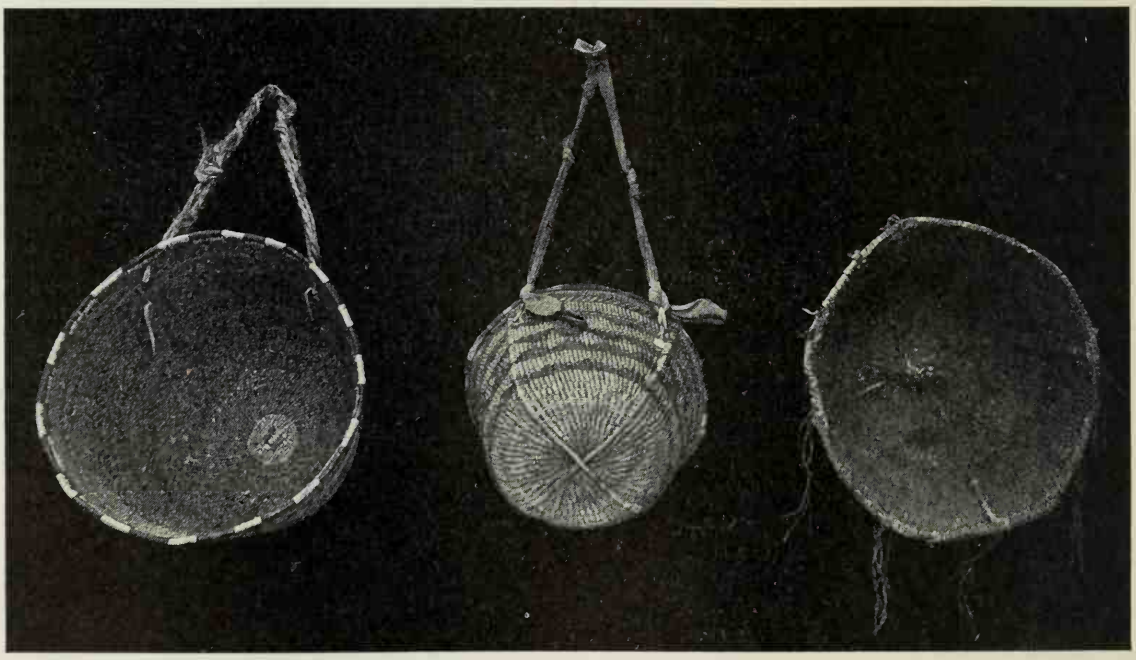

Fig. 6 *a–c* (50–8682, 8787, 8823). San Carlos Twined Weave Burden Baskets.

quite likely that the incongruity of mixing woven and painted patterns is as apparent to the Indian woman artist as to ourselves.

Dyed withes are easily distinguishable from painted ones, even when the work has been very carefully done, by glancing at the inside of the basket. Dyed materials show inside and out, as may be seen from 5*a* and 6*a* where the same basket is portrayed. The bands are in red, black and natural color (cottonwood). Fig. 5*f*, shows a basket decorated in red and blue bands, both painted, with a band edge of black which is all that can be seen on the inside. The design is almost perfectly applied.

From the list of varied materials given above, the uses to which they are put, and the ingenuity shown in seizing upon and adapting anything suitable which could be found in the meager supply available, one gains a respect for these people who work so hard for what they have and who strive by every means in their power to beautify the fruits of their labor.

For convenience, the following list of plants contributing to the basket work of the San Carlos is appended, with their common, botanical, and Indian names.

willow	*Salix* (*sp. lasiandra and nigra*)	*k'ailtu* *ka-jih*
cottonwood	*Populus fremontii*	*t'is*
mulberry	*Morus sp.*	
sumac	*Rhus trilobata*	*tselh kan'ī*[1]
cat's claw or devil's claw	*Martynia* (*Sp. proboscidea and louisiana*)	*t'si gol ca xa*[2] *ta g' at'-ĕ*[3]
yucca	*Yucca elata*	*bi ca ah te*
juniper	*Juniperus*	
piñon pitch	*Pinus edulis*	*dje*[4] *oh-ē'*[5]
squawberry or squaw huckleberry	*Vaccineum stamineum*	

[1]F. V. Coville, Apache term: *op. cit.*, 36.
[2]P. E. Goddard, San Carlos term.
[3]F. V. Coville, Apache term, *op. cit.*, 31.
[4]P. E. Goddard, San Carlos term.
[5]F. V. Coville, Apache term.

METHODS OF WEAVING AND TYPICAL FORMS

Twined Work

Among the San Carlos, the kinds of basketry technique in use as shown by the collection in the American Museum fall into two great divisions: twined and coiled. The San Carlos burden baskets and pitched water jars are twined; bowls, peltate and modern shapes, and fancy ollas are coiled. In the twined weaving, two or more active elements pass over one or more passive elements, the active going before and behind the stiff (passive) warp element, and above and below each other, alternately, so that they twine about the warp and at the same time, about one another.

Of the twined weaving, with two wefts, or active elements, there are several varieties, all of which are found on the burden baskets. The simplest is plain twine, with only two weft elements, twined over and under one warp. Of this there are no variations except in coarseness and fineness of workmanship. The second is known as twilled twined weaving. Here the same number of weft elements occurs, but two warps of passive elements are bound together by each crossing of the weft elements, or are included in one so-called stitch.

In either case, where there is only one, or where there are two warps included, both sides of the weaving look alike, for one weft is always behind and one in front (Fig. 5*b*, *d*, *e*, *f*). There are two kinds of twilled weaving, if Miss Kissell's criteria be taken.[1] First, the same warps are used each time in successive rows of weaving (Fig. 5, *b*, *d*, *e*, *f*, except for bands here and there; Fig. 6*b*, for the most part). The effect is that of vertical ribs, corrugated, crossed horizontally or nearly so, by flat narrow wrapping. This effect is occasionally varied by slipping along one warp (Figs. 5*f*, 6*b*). Second, with each new row of weaving, the two warps previously joined in the twining of the weft are separated, and a new group of two is made by the weft crossing between the old two and taking up one from each of two previously adjoining groups (the bands on the basket in Fig. 5*b*). This starting the row with one warp further along gives the surface a diagonal appearance, hence, the technical name of diagonal twilled twined weave. The first method described is simply plain twilled twine. The diagonal twining is by far the commonest in the San Carlos area for it occurs in burden baskets and is the only type of twining used for water jars, except for reinforcement at the curves where three-ply twine is occasionally found. Plain twining is also found on

[1] *Op. cit.*, 263.

burden baskets and when both techniques are combined in bands the effect is decorative and very pleasing. In her table of general basketry techniques, Miss Kissell has apparently made no distinction between these two kinds of twilled weaving, which is rather odd, as the effect in each is utterly different; among the San Carlos, at least, on the burden baskets the shift from one technique to the other is frequently made. On an otherwise plain mulberry basket this difference in weave affords just the right amount of ornamentation in bands, as the light throws first one, and then the other into relief. The interest is kindled the more, as the beauties are elusive, like brocade, rather than set forth in obvious patterns and afford a nice illustration of the utilization of technique for ornamental purposes which has been so well discussed by Doctor Holmes in his paper *A Study of Textile Art in its Relation to the Development of Form and Ornament.*[1] A third variety of twined weaving where three warps are used has also not been mentioned by Miss Kissell. Since, however, the weaving is always plain, or else comes under the head of three-ply twilled twined weaving, the effect is not different from that obtained with two warps.

A few specimens of mulberry carrying baskets are woven entirely in three-ply twined weave, but whether the wefts are simply twined, or braided, it is impossible to say without ruining the specimens (Fig. 5*a*; Fig. 6*a* which shows the same basket, and Fig. 5*c*). Both techniques are so well described by Mason[2] that it is unnecessary to repeat here. The results of the two processes look absolutely the same unless unravelled. Three-ply twined weave is used occasionally in bands for decorative effect or in single, double, or triple rows where added strength is needed on a simply twilled basket in such places as the base, curve of shoulder of the jar-shaped baskets, or the top, just below the rim. The twined baskets are worked from the outside and the twining proceeds clockwise. Finished splints are drawn to the outside or inside, as the case may be, and new ones added by leaving a loose end out or in. All ends are clipped close when the basket is finished and "set."

Burden Baskets. In starting the burden basket, *tha tca*, which is more or less conical in shape—except for the fact that the bottoms are rounded when not reflexed—and likewise in beginning the twined water jars, several methods are in use. One occurs in the burden basket in Fig. 6*a*. Here six warp strands are laid at right angles to six more, these having previously been bound back and forth, as in the weaving

[1] *Sixth Annul Report, Bureau of American Ethnology*, Washington, 1888, 189–252.
[2] *Op. cit.*, 79–82.

used in the Hardanger stitch in embroidery, into three groups of two each by sending the binder over two, under two over one and back by reversing the process. This is done until the square formed by crossing them where they are wrapped is completed. Then in the angles, extra warps are added and the twining around and around begins, warps being inserted as needed, but without any mathematical regularity. Close examination of the photographs of burden baskets will show the added warps. All uprights are left full length during the process of twining. They are never bent back into the fabric when the basket is completed to insure a better edge which will keep the twining from working off, but are either cut off short or topped with a rim coil laid along their ends, the foundation of which is a bunch of grass or splints (in water jars) or a single solid rod in burden baskets. The sewing splint catches through the last two or three rounds of twining. The new twining elements or weft are introduced when the first give out, the ends being allowed to protrude for an inch or two on the inside or outside of the basket. When the basket is finished, these are clipped close to the surface so that they are scarcely to be seen. In making vessels with constricted necks, loose ends on the inside are clipped as the work progresses.

Other methods differing from that described above may be followed in starting the bottoms, such as grouping four, two and two, or almost any number. (Fig. 6*c* has four groups of two, arranged like the spokes of a wheel.) One rarely finds such a clearly defined way of beginning as that shown in Fig. 6*a*. In fact, in almost every particular this basket is unusual. Its fineness of workmanship, beauty of color, neatly made bottom and lack of side ribs, all mark it as a special product, not intended for common use, the acme of perfection in the weaver's art.

Sometimes the bases of water jars and burden baskets are reflexed and this lends them the stability necessary in receptacles holding liquids, small fruits or wood. But these are never well made, the superior workmanship being always shown in baskets with more conical bases, a fact which would lead one to think that, in all probability, the reflexed type is newer and the construction not yet satisfactorily worked out. The really good and neat workmanship on baskets with reflexed bases is seen only after the curve of the base is rounded into the side walls, while the bottom is a hodge-podge of labyrinthine weaving by which the desired end was accomplished, the method being only dimly discernible. Unfortunately, owing to the writer's inability to interview the people personally in regard to how they solve their technical problems, detailed information as to this part of the construction cannot be given here.

The interior and exterior of reflexed bases are shown in Figs. 6*b*, *c*. These are quite neat examples, better than the average. It is noteworthy that the reflexed base has been adapted to the necessary presence of rigid side ribs, by placing these so that they cross below the base and enter the side walls above the curve of the bottom, thereby not interfering with its stability. In Fig. 6*b*, the three-ply twined weave at the curve of the base may be distinguished.

Near the top, in many specimens, is a neat device attached to the inside of the basket, in the shape of two wooden pins which lie, one on each of two adjoining ribs parallel with them (Fig. 5*d*, *e* and Fig. 7). Sometimes these pins are notched at the top and bottom so that the thongs which fasten the carrying strap to the side of the basket and tie around the pins may not slip and consequently wear holes in the woven fabric. The pins likewise strengthen the ribs at the point where the strain is greatest when the basket contains a heavy load.

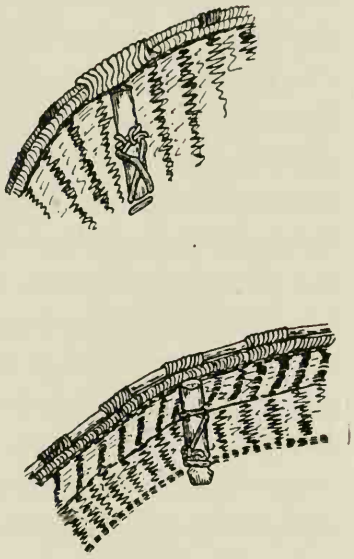

Fig. 7. Pins for securing the Handles on Burden Baskets.

Most of the burden baskets intended for use have two rims, one immediately above the other, for experience seems to have taught the makers that an extra wearing quality is to be obtained from a reinforced edge. The foundation of the lower rim is a heavy stick, bent like a hoop when green and this is overcast with withes of the same material as the basket. The foundation of the top rim is also of wood in older specimens, but galvanized iron wire has been made to serve the purpose in recent years. This has been a great improvement in reinforcing the rims, especially as there is no other way to lift the basket when loaded, except by grasping the rim or the carrying strap. Rawhide thongs usually constitute the sewing material for covering wire rims employed in the baskets illustrated in Fig. 5*d* and Fig. 6*c*. When completed the burden baskets average about forty-five centimeters in depth with about the same mouth diameter.

Occasionally rawhide strips are fastened up the outside of the ribs as shown in Fig. 5*b*, *d* but these serve a purely decorative function (Fig. 5*c*, where there are no ribs), the strips being rubbed up with ocher to a soft shade of red or yellow. Fringes are often placed around the circumference

of the "patch" on the bottom and likewise in bunches at intervals up the side ribs and around the rim.

The baskets are usually lifted and swung on the back by means of the carrying strap which is slipped over the head and allowed to rest across the chest and shoulders just below the neck. It is rather difficult to see why the strap does not slip up across the throat for there is nothing to prevent this, but no doubt the people have learned to hold it in place by some delicately controlled movements just as Mexican women keep the *rebozo* on the head to the great mystification of white women.

When gathering small fruits which are to be carried in the burden basket, it is not removed from the back, but the woman throws what she has picked over her shoulder into it.

Ollas or Water Jars. The water jars, *tūs*, are very crudely made. From the beautiful burden baskets woven in the same technique, it is quite apparent that the poor workmanship displayed in many water jars is not due entirely to lack of proficiency. In their coiled work particularly, which in modern products is usually very fine, and in less numerous but equally excellent examples of twined weaving in the better type of burden baskets, the San Carlos have shown themselves, not as individuals, but as an entire tribe, to be weavers of no mean accomplishments.

The water jars, however, are subjected to hard wear. They must be covered with several coatings, a filler and a varnish of piñon pitch, to render them water-tight, a process which frequently, but not always, obscures the technique and makes it scarcely worth while to expend the infinitely greater patience and length of time which would be required on a fine piece of work. In many of the more recent products, the form is fairly good, but aside from this and the fact that they serve their purpose, there is little to commend them to the student or lover of basketry.

The bottoms are begun like those of burden baskets, by a crossing of the warps, and, as with the former, considerable variation occurs in the way in which these are grouped and the neatness with which the work is executed. Side ribs, however, are lacking. Many of the water jars have reflexed bottoms which increase their stability. The old custom of hanging the jars to a house post still prevails, although now and then one is seen resting on the ground. Those evidently intended to be carried about, like canteens, have straps and pointed, unsymmetrical bottoms. There are no fine shapes among them, such as the top-shaped basket jugs manufactured by the Ute, where the insertion of extra ribs in the side walls for the purpose of increasing the diameter occurs with such regularity as to suggest mathematical calculation and where the surface is as smooth as if turned on a lathe.

Fig. 8*a-e* shows a few San Carlos water jars. When struck they give forth a ring quite like that produced by pottery. The type represented by Fig. 8*a* seems to have enjoyed quite a vogue. There are several specimens of this shape in the Museum collection. Although with the heavy coating of pitch applied to most of these double jars, it is difficult to detect the exact method of manufacture, the stricture in the center was probably produced in two ways. First, short warps were introduced to assist in

Fig. 8*a–e* (50–8732, 8981, 8764, 50.1–2099, 50–8681). San Carlos Pitched Water Jars.

obtaining the desired increase in diameter and then a few were cut out at the stricture, but not as many as the photograph would indicate. Also, while the pitch was still warm and soft, something seems to have been tied tightly about the center, to constrict it as much as possible. Beads and silver buttons are embedded in horizontal alignment on the circumferences of the two globular parts at their greatest diameters. The crudeness of form and unskilful application of the pitch, together with the blackness of age, would indicate that these are old specimens, even were it not known that they belong to collections made many years ago.

Fig. 8*b* represents another crude type. The two handles to which

the carrying strap may be tied are pieces of naturally bent sticks, sewed to the wall of the basket with withes, and held fast by great lumps of pitch.

Fig. 8*d* is one of the red variety. The superiority of workmanship displayed, in contrast to that evidenced in Fig. 8*a* and *b*, is considerable. The shape is much more symmetrical, the handles are made of split sticks, flat on the under surface and carefully smoothed on the upper rounding sides. The application of the pitch is neatly accomplished, being sufficiently smooth and thin to permit the weaving to be clearly discernible even though an under surface of pounded juniper leaves and red ocher is visible, filling the depressions between the stitches. The design in black paint does not show in the photograph.

Fig. 8*e* is a splendid example from the standpoint of good workmanship. The presence of three lugs, while not unique, is rather uncommon. In shape, symmetry, firm base, and good weaving, it is worthy of comparison with Fig. 8*c* which is a classic coiled specimen, originally used for some other purpose than holding liquids. Fig. 8*c* is a graceful, symmetrical jar, well made, and bears a fan-shaped design in devil's claw, which may still be dimly detected on the inside. The pitch has been applied in a more or less clumsy fashion and has chipped off in large pieces. Good-sized lumps, much thicker than any varnish found on late products, may be seen still adhering to the inside. Evidently the pitch was not properly melted.

The lugs are of leather, at least four centimeters wide and half a centimeter thick and are fastened to the basket by means of heavy sewing splints which pass back and forth through holes perforated with an awl.

Other lugs than those described above are made of horsehair, braided and drawn through holes made by an awl in the walls of the baskets. They form a series of loops, left loose on some baskets, and on others caught together in a binding of single or braided strands of hair or cloth. Twisted bark, reinforced with copper wire, has also been employed in this manner. Where there are only two lugs, the usual and proper distance between them is about one third of the entire circumference of the basket. The strap is then attached to one lug, drawn tightly over the shoulder of the vessel and across the neck, to the other, where it is again tied or wound around it and fastened to the first in a loop long enough to permit passing it around the forehead or shoulders of the person who carries the jar on the back. The lugs are, of course, on the outside and the tension of the strap across the neck on the "short" side of the jar, keeps it in a nearly upright position as it is being carried.

The foundations of the rims of Fig. 8*a*, *b*, *d* and *e* are not three rods, as in the case of Fig. 8*c*, but are composed of bunches of bark scrapings and grass, which are now and then used for the rims of water baskets, and no attempt has been made to obtain a smooth coil. The stitching of such rims is usually a very poor false braid. These crude water jars are the only San Carlos specimens which have come to my notice that are finished at the rim in this technique. It is by no means invariably used, for many jars are completed with the ordinary overcasting, while some lack a specially finished edge, the warps being clipped close to the twining at the top, the weft held firmly by the pitch from slipping up over the ends.

Water jars vary in size from eighteen to nearly sixty-one centimeters in height, with a slightly less measurement for the greatest diameter. Fig. 8*c* and *e* are about forty-five centimeters high and the same number in breadth.

Close Coiled Work

So far as the collections in the American, Field, and United States National museums show, there are no San Carlos examples of plaiting, wickerwork, crude or lace coiling, lattice or wrapped weave, except on baby carriers. Occasionally, the hoods of baby carriers are of wicker or the rods forming the band are held in place by single rows of twined string or thongs placed here and there. Lattice work does not occur in basketry, but is crudely represented on the bottoms of these cradles which are sometimes of heavy wooden slats lashed to an oval framework. It is difficult to procure a carrier which has ever been occupied by a child. There seems to be some superstition about harm coming to the baby if anything happens to its cradle, so when the child is too old to be tied into his little carrier, the mother secretly disposes of it. This curious belief about cradles occurs elsewhere than in the Southwest, but the extent of its distribution is not known.

Close coiling is the technique used in the construction of all bowls or other flat dishes, elaborate jars, and eccentric shapes. The San Carlos name for the bowl is *isä*.

Practically all coiling on the flat shapes takes an anti-clockwise direction, although a few examples of clockwise spirals have been noted. If left-handedness would result in a clockwise coiling of bowls and the like, then it is apparently either rare among the San Carlos or else for the most part it has given way to conservatism in work methods. In this connection, however, it is interesting to observe the few cases of whirling

lightning designs which seem to be conceived in a manner directly opposite to that of most lightning patterns. (See Fig. 12*h* and p. 212).

The direction of coiling for jars is also from right to left, but appears to be the opposite and clockwise because these shapes are worked at from the outside, with the point of sewing on the curve next to the worker rather than away from her, as with bowl forms, which are sewed from the inside. It is a pretty safe generalization to state that all jars are worked from the outside and all bowls from the inside. Their respective shapes would render easiest the method of working adopted in each case. But the different ways of holding and working must always be considered in deciding the direction of coiling when studying a basket. A source of confusion as to whether the coiling may have been clockwise or anticlockwise is found in a few San Carlos specimens which, owing to an altered decision on the part of their makers at the last moment, were "finished off" while they still resembled bowls.

It sometimes happens that after completing a round bottom, the basket maker will reverse its position in adding the sides, turning the wrong side toward her and beginning a new coil, which now revolves in the opposite direction to that of the bottom as viewed by the worker. This change in construction is also apt to be a source of confusion to the uninitiated student, although the junction of the coils settles the doubt. The determination of the side from which the sewing has been done is sometimes a difficult matter, also, but even where the baskets are characterized by the finest workmanship there is always a slight roughness on the wrong side, due to the furcation of the stitches as the point of the awl emerged and after a careful examination of the basket the closely clipped ends of the sewing splints may be seen crowded tightly between the stitches. These ends never appear on the right side.

When a woman decides to make a coiled basket she selects from her supplies, which were gathered in the spring and fall, enough bunches of scraped foundation rods and rings of sewing splints, together with devil's claw for working the designs, to suffice her for her contemplated basket. The rods are untied and immersed in water, as is the sewing material, for a few hours before she begins her work, so that they lose their stiffness and brittleness without becoming water-logged. Some women obviate the danger of having too well soaked splints by burying them in wet soil, from which they draw them one at a time, as needed. An awl and knife are necessary for the weaving. The woman sits on the ground comfortably and selects three rods which she holds at one end in her left hand, allowing the rods to extend to the left. Having arranged them in

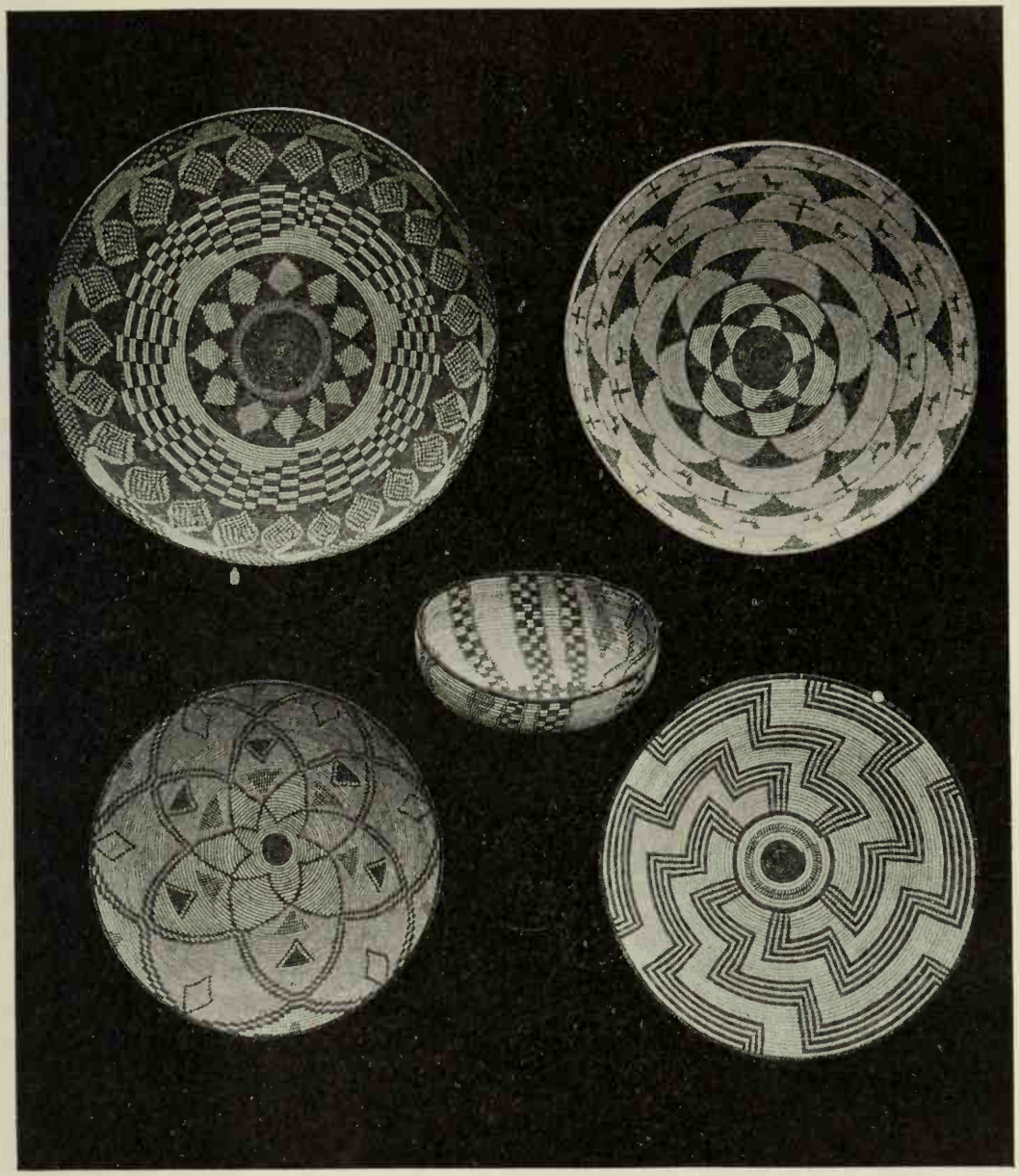

Fig. 9 *a–e* (1–5196, 5197, 5247, 50–8762, 8702). San Carlos Bowls, Coiled Ware. Design interpretation: *b*, "at the great exodus."

clover fashion, she picks up a sewing splint, one end of which she lays across the ends of the rods on the side toward her, holding it with the left thumb so that the short end of the splint is pointing upward and to the left. The right hand wraps the splint around the rods several times, first, under them away from her, and then, up over them towards her, covering and securing at the same time the end which the thumb is holding.

A very short distance is wrapped with a few rounds and then the rods are bent down and around to the right. The unwrapped section of the bunch of rods is bent around the wrapped section and the whole is turned so that the loose rods again lie towards the left. The sewing splint, after being wrapped around the bend, is passed through a hole made in the original wrapped section by the awl, which is driven through the center of the top foundation rod (two rods being below it) splitting it as it goes between two rounds of the sewing splint. The splint is pushed through the hole quite easily when its end is sharpened and is drawn away from the worker on the wrong side. She pulls it taut and makes a second hole, just to the left of the first one, while she holds the splint end which she next brings up over the top of the bunch of rods, between her left thumb and forefinger. The splint is again pushed through, pulled tight, and over the top, a third hole is made, and so the work continues until the original wrapped section is enclosed on one side. When the blunt end of the wrapped part is reached, the awl penetrates the bunch of rods, a little back of the first round of wrapping, so that a firm hold is obtained; after the end is sewed in, the sewing continues along the other side of the wrapped part. For modern oval shapes, the bottoms are made of elongated coils, which are started with a comparatively long wrapped section to which the surrounding coil is sewed.

The coiling goes on, around and around, each spiral increasing in size, new foundation rods being added as the first ones are covered. Since these are of varying lengths, two seldom finish at the same point, and it is quite easy to insert a new one, by pushing one end of it against that of its predecessor, as closely as this can be done, and covering the joint with a new stitch. When it is necessary to renew a sewing splint the old one is merely pulled through to the wrong side as if it were going to be continued in use and is left there until the basket is finished and dry. It is then clipped off close to the coil where the end is almost invisible, and because the stitching is very tight and the previously dampened wood has dried and set in rigid curves it is practically impossible to unravel the splint from the right side. The new one is drawn through the

hole made for it, the short end on the right side being held under the left thumb until covered by the ensuing stitches. The same method is resorted to in introducing colored splints for designs.

When perforating the foundation, the awl in coming out at the back sometimes slightly furcates the left of the two stitches covering the coil below, between which it has been inserted from the front. The furcation is not intentional with the worker, however, and the sewing is quite irregular in this respect; nor do the stitches interlock.[1] At other times the furcation varies greatly from the splitting off of a mere thread to nearly half of the sewing splint. This furcation always occurs on the wrong side, never on the right, and is not pronounced enough to attract much attention. It results from the fact that all stitches in coiled work slant one way or the other on the wrong side according to the direction of the coiling so that they lie a little in the path of a straight perforation from the front. The San Carlos evidently do not consider it as a blemish for otherwise, being such able technicians as they are, they could easily correct the trouble. Nor do they seem aware of the possibilities of furcation as a means of ornamentation, a fact which has not escaped the Chilcotin on the Northwest Plateau, who use it on the outside of their baskets. Sewing splints frequently become roughened during sewing, giving the basket a fuzzy appearance, but this is improved by rubbing and polishing the finished product with a stone.

Throughout the basket, the size of the coil is usually remarkably uniform, but its diameter for different baskets covers a considerable range, regulated more or less according to the size of the form. A good average coil is about four mm. in thickness but coils have been found to vary from a little over two to about five mm. In the first place rods of the same size are selected and each is examined carefully for any roughness or unevenness. If this is properly attended to, the most practised weavers experience little difficulty in producing even coils for they have a highly developed tactile sense.

The baskets are shaped without any gauge and it requires a nice discrimination to give the walls the proper slant without placing the coils too far out or in. Ability to estimate the alignment correctly is dependent upon a natural eye for lines and curves and upon practice, as well as upon delicate fingers. The work of a young girl is apt to be uneven in many respects. Although with the twined water jars and even with the more

[1]Mason, O. T., *op. cit.*, 84, and in his discussion of three-rod foundations, p. 97, says that in most coiled basketry the stitches interlock. I have not found this to be the case for the Southwest except as incidental to piercing the foundation and Doctor A. V. Kidder, together with Mr. S. A. Guernsey, found no interlocking in the Basket Maker material which they studied, as Doctor Kidder informed me by correspondence.

carefully made burden baskets, very good shapes are rarely attained, in the coiled work the San Carlos are past masters of symmetry and beauty of form.

When the new coiled basket is judged to be tall enough, the rim, which is also a three-rod coil, usually of the same size as the others, but sometimes larger, is added. It may be sewed entirely with devil's claw or *Martynia*; occasionally it is made with alternating stitches of black and light or with alternating sections in these colors, or very rarely all in the same material of which the basket is made. Figs. 5*a*, *e* and 9*b*, and 10*a* and *c*, 11*f*, and 12*h* illustrate rim varieties. When the alternating black and light stitches are used, the worker carries along two sewing splints at a time, taking one stitch with one, the next with the other. As she nears the point where she intends to finish the coil, she pares down the foundation rods so that at the end the rim almost vanishes to the level of the coil below.

The rims are usually finished with plain over and over sewing. The fact that false braid occurs so rarely on San Carlos baskets and then only on twined water jars which are also manufactured by the Ute with great technical finish, and that the San Carlos attempts are so miserably executed, would indicate that this technique has not long been known to them. Fig. 8*b* has a rim of this description, but it cannot be seen in the illustration. The method of procedure in making it is as follows. The sewing splint is drawn through the basket away from the worker, until the end has nearly disappeared. It is then carried up over the rim towards the worker and to the right and penetrates a second hole made for it above and to the right of the first hole. Through this it is drawn tightly away from the worker, carried up again over the top of the rim toward her, crossing the previous stitch nearly at right angles as it passes over it to the left. Then it is carried down in front of her and penetrates a third hole on a line with and to the left of the first. From here the process is repeated.

Loop work rims are apparently unknown in this region.

One type of freak weaving has been discovered which is probably an instance of playing with the technique. The first specimen noted was found in the American Museum and a few remarks were published about it in the *American Anthropologist.*[1] Since then word has been received from Doctor J. A. Mason of the existence of a second specimen (Salinan)[2] and recently two more (San Carlos) were found in the National Museum

[1] "Double Coiling" (*American Anthropologist*, n. s. vol. 18, 601–602, 1916).

[2] "The Ethnology of the Salinan Indians" (*University of California Publications in American Ethnology and Archæology*, vol. 10, no. 4, 147).

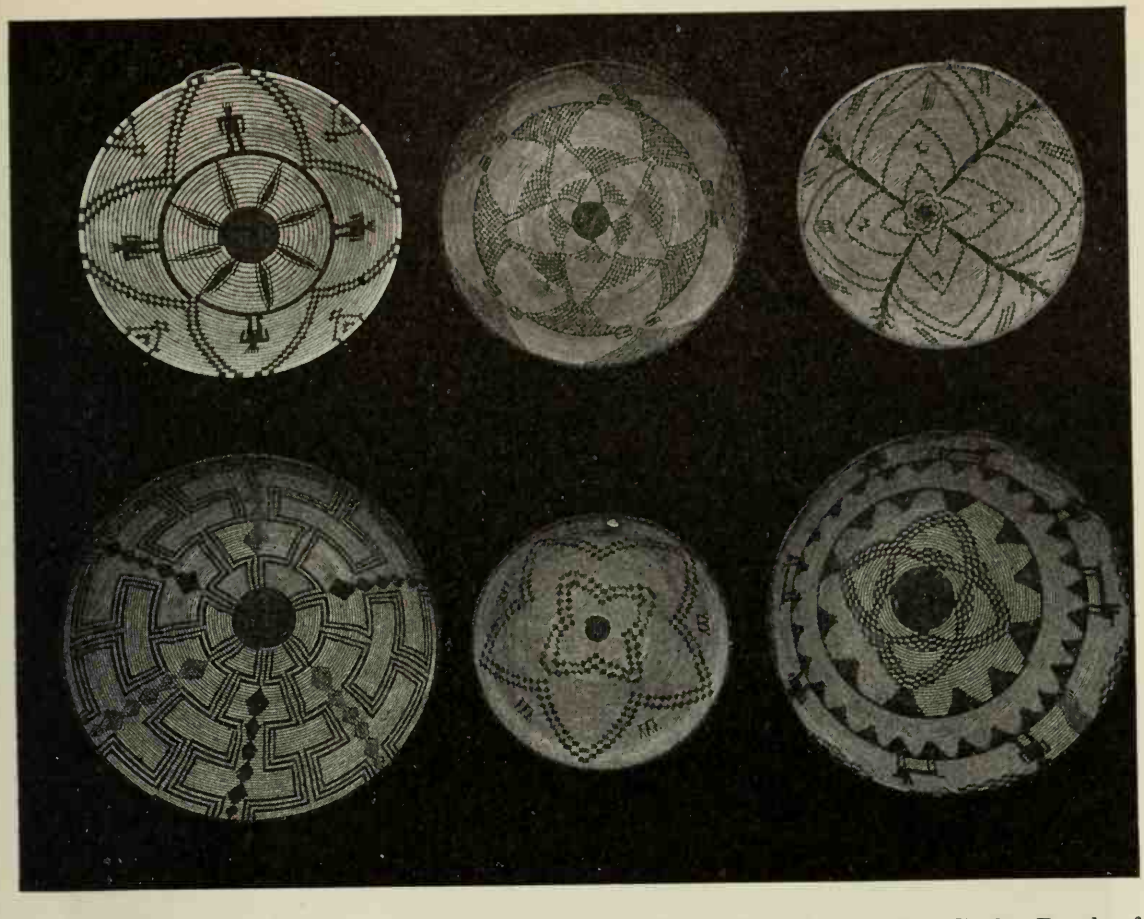

Fig. 10 *a–e* (50–8767, no no., 1–5209, 5199, 5227, 5203). Modern San Carlos Bowls of Coiled Ware. Design interpretation: *a*, "center"; radiating figure, "taken from a sand painting"; the circle, "painted on the ground"; the human figures, "*gans* dancing," the oblique lines, "their trails," at the rim, "inverted tipis."

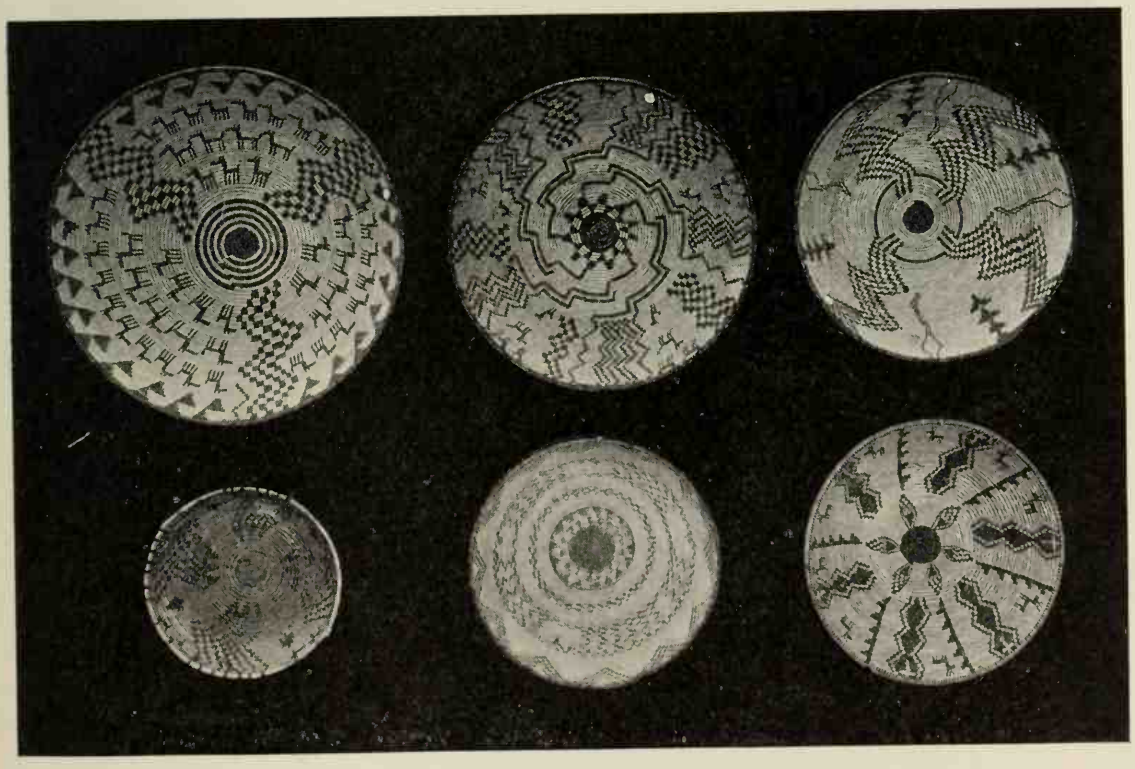

Fig. 11*a–e* (50.1–2151, 1–5208, 50–8752, 1–5205, 50–2813, 1–5200). San Carlos Bowls of Coiled Ware of the Middle Period (except *a*, which is an Unidentified Apache). Design interpretation: *c*, "lightning, coyotes trotting, and black triangles."

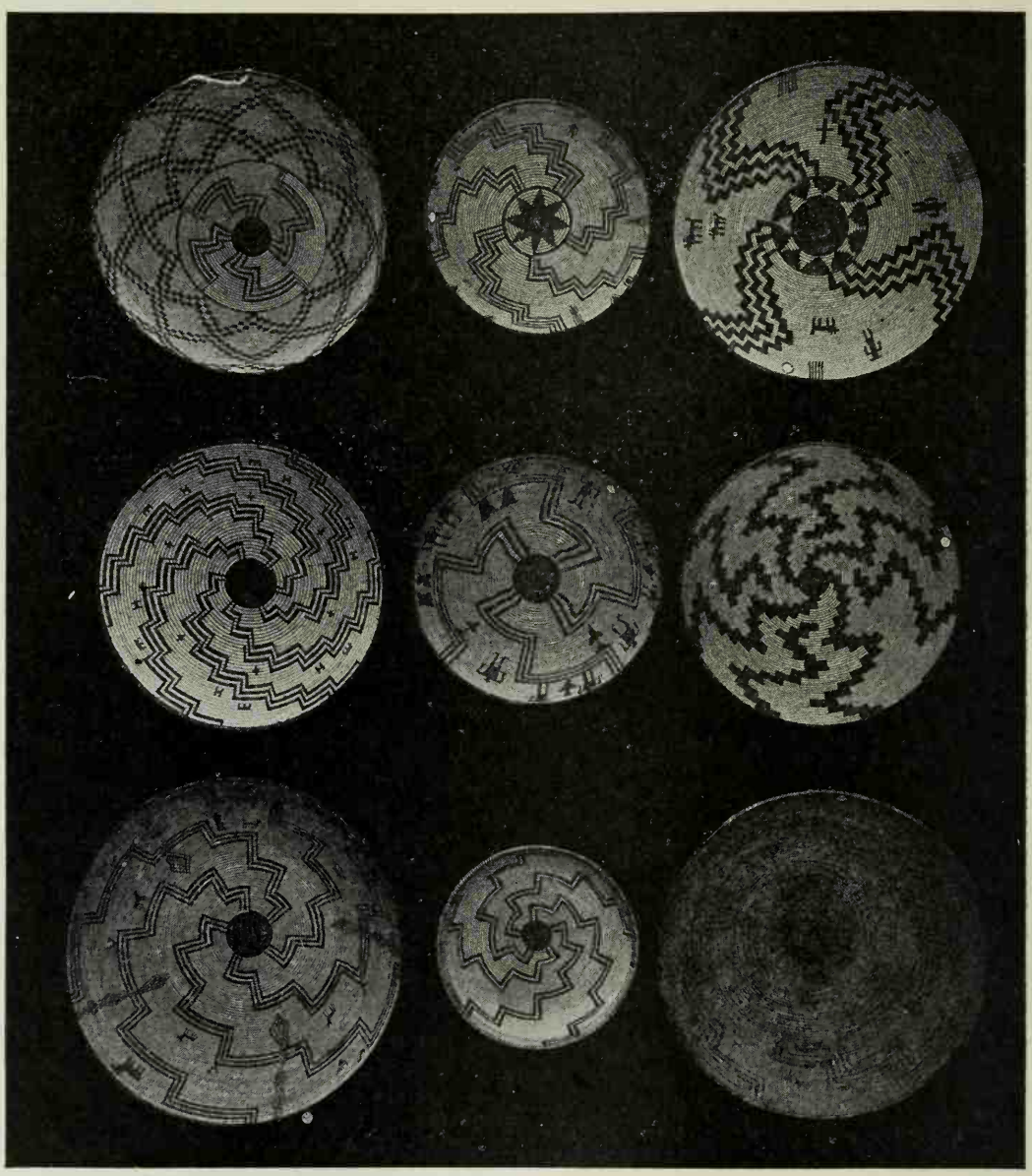

Fig. 12 *a–i* (1–5204, 5210, 5201, 50–9000, 1–5214, 5215, 5198, 5229, 50.1–4240). San Carlos Coiled Ware Bowls, Ancient and Modern, showing Variations of the Lightning Design. Design interpretation: *d*, "lightning, cross"; the small figures were copied from a paper the maker saw and are very modern; *g*, "wandering with animals"; the checker figures show the way out.

at Washington which had not previously been noted and described. These two were ollas, one unfinished. The complete specimen measured about 1.21 meters in height and was 76.2 centimeters across at its widest diameter. It is shown in Fig. 13.

All the San Carlos specimens were made by carrying along two coils at a time. In all three cases the bottom was started with a single coil, which later was split into two parts. In the case of the large olla in Washington, the division of the coil occurred at the curve formed by the junction of the base and side wall, and from there two coils were carried to the top where they ended at opposite sides of the basket. The specimen found at the American Museum is pictured in Figs. 3 and 4. In Fig. 3, the lower cut shows the division of the original coil at about half size. In the upper cut, just below the rim of the basket, the junction of the two coils may be discerned. In joining the two coils again and finishing with a single rim, the specimen differs from that found in Washington where the two coils end on opposite sides of the orifice. Fig. 4 shows the entire basket, its complicated design, excellent workmanship. The division of the coils occurs just at the end of the checker pattern and the junction immediately preceding the addition of the black rim.

This particular basket is of the coarse red willow mentioned on pp. 139-140 and was collected by Doctor Goddard. It is beautifully made, although not quite so closely sewed as the modern ones; the sewing splints too are nearly twice as wide as those employed on fine specimens made nowadays. Since it was apparently made many years ago, and the other two specimens likewise in the days when tourists were not so plentiful, the double coiling is quite likely a genuine product of Indian invention. The two coils were not sewed simultaneously, with a figure-eight stitch, as might be supposed, but the lower coil was sewed a little way first, and the upper afterwards fastened to it. Had the figure-eight stitch been used, the woman's labor might have been slightly lessened. It may be that she thought she was accomplishing that end, for like the olla, this is a huge specimen of its kind measuring 63.5 centimeters in diameter, although only 14 centimeters high at the rim, and must have required a long time to make. Working in such a manner may also have helped her in placing the design; by filling in more of it at one time she may have been better able to foresee how it was coming out. Again, it may have been merely the playful expression of an artist. It would be interesting to ascertain from the woman herself what her idea was and how she came to make baskets in this way, for it is quite possible that she made all three examples now in Washington and New York.

Fig. 13. San Carlos Double-Coiled Olla or Water Jar. *By Courtesy of the United States National Museum.*

This is one of the largest coiled baskets ever manufactured by the San Carlos. It measures nearly 100 centimeters in greatest diameter and is about 135 centimeters high. From where the side walls begin it is constructed of two simultaneous coils which finish at opposite points on the rim.

The Salinan specimen discovered by Doctor Mason is in the collection owned by the University of California. It differs from the San Carlos examples in that the two coils were commenced simultaneously one within the other. Doctor Mason says, concerning what the maker of this specimen told him:—

> When questioned in regard to this technique, the maker replied that the 'old people' made baskets in that way and she wanted to see if she could imitate them. This statement would seem to indicate that the technique is aboriginal; indeed, its individuality would preclude the explanation that it may be due to modern influence.[1]

Here, in the case of the Salinan and San Carlos double-coiled baskets, is a clear and comparatively rare illustration of the production of the same technical result by two somewhat different procedures. The process is sufficiently odd in either case to have escaped general adoption or even general notice in a technique which ordinarily would be satisfactorily developed without it. Nor is it a method that would present itself often to the imagination, so that numerous instances of its independent development are not likely. At any rate, double coiling seems to have had at least two distinct origins, for the Salinan and San Carlos tribes are widely separated and the coil foundations in the two regions are quite different, the Salinan tribe using grass.

Caulking

The process which jars undergo that are intended for holding liquids is very simple. The pitch of the tree *pinus edulis* is collected in large quantities and placed over the fire in a clay receptacle, where it is reduced to the consistency of thick molasses. Some baskets are first coated with pounded juniper leaves with which red ocher has been mixed or else ocher is applied as a second layer. It is thought that this process aids in rendering the basket waterproof. As a matter of fact, it simply provides a smoother surface for the pitch varnish, as filler does with wood, and lessens the possibility of bubbles. Thirdly, any painted design which the artist desires to add is applied in black. However, most water jars are plain and the coatings just described are omitted with the exception of the pitch.

When thoroughly melted, the pitch is removed from the fire and all lumps in it are scooped out with the yucca strainer. The basket is placed on the ground beside the bowl containing the melted pitch, and with a yucca brush the varnish is smeared over the basket in small streams. Then the jar is held by the hand placed within the orifice and turned until the surface is evenly covered. Some of the gum is also poured on the

[1] Mason, J. A., *op. cit.*, 147–148.

inside of the vessel which is shaken around until it is fairly evenly distributed. The basket is then held over the fire and turned slowly until the pitch, which has hardened somewhat during the application, again softens and assumes a still more even surface. It is often held in the smoke after this until the varnish acquires a dull soft gray finish like the bloom on grapes, but many women omit this final stage, preferring the shiny surface or not caring to give their time to securing the other. The degree of finish of the baskets betrays quite clearly the characters of their makers. In many cases much care has been given them, but with others it is all too evident that the chief object of the maker was the obtaining of a waterproof receptacle, regardless of its appearance. When properly heated and applied, the pitch varnish is very durable. It becomes hard and smooth and rarely chips off. Specimens subjected to imperfect processes soon show signs of wear. The coating on these is resinous and grainy and the slightest blow crackles and chips it, so that it is not long before the woven fabric is again exposed, although usually the waterproof quality is not impaired.

Mending

Worn baskets are sometimes patched very cleverly, although by no means invisibly, but twined baskets are usually not worth the effort. The patched specimens at the American Museum are all of very old coiled wear. In some of these, coils of nearly the same size as the original have been introduced at the broken places and sewn to one another and to the body of the basket. Fig. 14*f* has a rim patch. The Field Museum has a specimen which has worn badly around the outside edge of the bottom so that it has nearly fallen out, but was subsequently sewn to the walls by lashings of rawhide. Occasionally, new bottoms of canvas or some similar material replace the coiled one when it has served its day and these refurbished utensils are used for grains, either to hold ground meal or for winnowing, a process which the women accomplish by tossing the grain into the air by the bowlful, letting it fall back in the basket or on to a mat provided for the purpose. A light wind carries away the chaff.

The coils of those parts of a basket which suffer the most wear from handling or contact with the ground are not made larger, with a view to increasing their durability, as is done by the Salish, only a few of whom realize that a difference in diameter is of no consequence if the sewing material is no heavier. Nor do the San Carlos increase the weight of their sewing withes at these points. They do, however, realize the durability of cat's claw which they largely use for binding rims, and likewise the extreme toughness of the squawberry from which they make twined ollas.

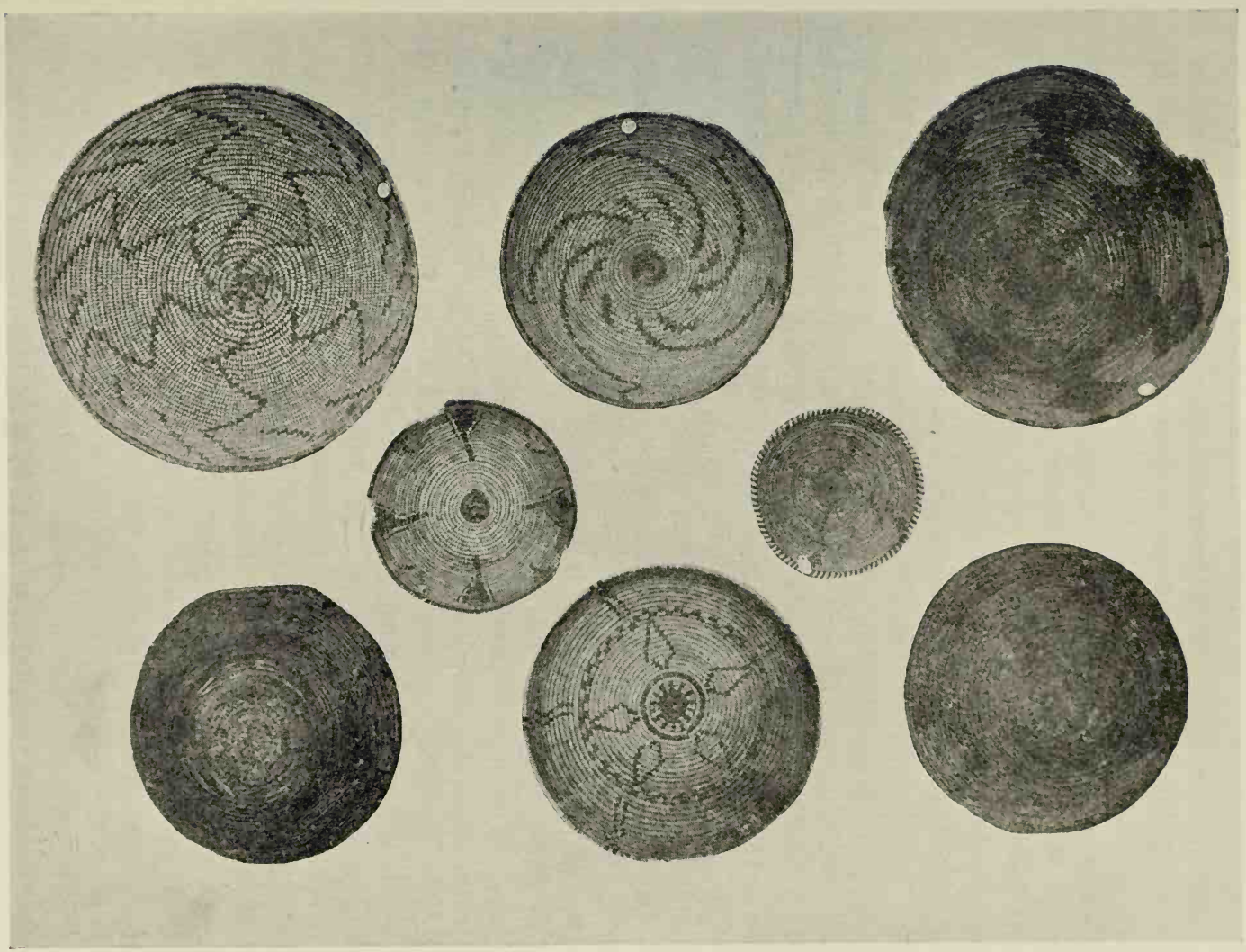

Fig. 14 *a–h* (50–8891, 8745, 8782, 8734, 8936, 8894, 8750, 8779). Old San Carlos Coiled Ware Bowls used for Cooking and Serving Food. Design interpretations: *a*, "lightning"; *b*, the maker refused to interpret the design; *c*, "cross, crescent moon, diamond figures, in the center"; *d*, "bottom put it, crescent moon, cross"; *g*, "diamond figure," the circle of interrupted figures "picture of beads"; "lightning."

FORMS AND PROPORTIONS

Uses of Forms

Long ago Doctor W. H. Holmes in his paper previously referred to[1] stated the guiding principle for the student of basketry form when he said:—

> Form in the textile art, as in all other useful arts, is fundamentally, although not exclusively, the resultant of expression of function.

And he adds

> In primitive times when a utensil is produced functional ideas predominate.

In conformity with this statement we find that the San Carlos baskets may be grouped, according to the three important functions which they perform in Apache life, into three distinct types, all of which, in outline, capacity, and general structure, approach the best utilitarian solutions which probably could have been devised for the problem of providing light unbreakable utensils suited to the needs of their makers.

The most important problem for the Apache was the securing and storage of water (and other liquids), which, in their arid country, was none too plentiful. For this purpose, the water jar was admirably adapted.

Of equal importance were the problems of securing food, carrying it home from a distance, together with fuel, which must be sought far and near. The people traveled some distance for berries and small wild fruits and nuts, as well as for bits of timber large enough to make adequate fires. For their transportation the burden basket with its conical shape and wide mouth could not be bettered for the service to which it is put.

Household utensils are very necessary, even in Apache homes. The Indian housewife could not any more manage without her bowls and trays than her white sister. She has any number of such receptacles of all sizes and depths to meet her requirements—for holding meal, winnowing grain, parching corn, boiling food, mashing berries, mixing doughs, serving stews, and holding water for cooking, washing, and laundry. The bowl is the simplest, most obvious solution of all these problems, as its worldwide distribution proves. A difference of a few inches in diameter or depth permits a variety of utensils capable of serving many purposes and so, with her half a dozen or more household baskets, the Indian woman accomplishes a great variety of tasks. On the other hand, the shaman, well aware of the serviceability of these simple forms, has

[1] Holmes, *op. cit.*, 196.

acquired a supply for himself, although he does not use them very much in ceremonies. Basket trays are still employed to hold sacred meal, and in the adolescence ceremonies for girls they hold the clay with which the girls are painted and the seed corn which is sprinkled over them. It is probable that these baskets are used over and over again in such ceremonies, but in themselves they do not seem to be particularly sacred. When special ceremonies in which they have been employed are over, and there is no need to keep the bowls for another season, they become the property of the medicine women who usually employ them in quite ordinary ways around their homes.

In many tribes the housewife knows and calls her bowls by different names, depending on their size, shape, or use. Hence, two bowls of exactly the same size and shape might be called by different terms because often the grandmothers of the tribe hand down their favorite bowls, together with the original designations, in their families by whom they are used until they literally fall apart. Miss Kissell tells of finding a veritable heirloom, a prize not only for its age, but for its beautiful workmanship and design, which she rescued just in time from the refuse heap, and other collectors have secured some fine old specimens in similar ways. The general term for bowl among the San Carlos is *tsa niskagi*.

Considering the length of time and the care necessary for making a really fine bowl, one realizes that the Indian woman is not lazy who completes several in one year, in addition to attending to her household duties, her children, her crops and food gathering.

Beside these three great divisions of basket forms produced by the women,—water jars, carrying baskets, and bowls,—there are some divergent shapes now manufactured largely for the tourist trade which are probably copies of foreign receptacles introduced by the whites, although a few are quite old. Such are the oval, flat shapes with lids, and cylindrical forms about the size of waste paper baskets, as well as the large ollas previously mentioned. Such odd forms are few in number and their undoubted foreign origin eliminates them from the present discussion of classical shapes. The San Carlos display none of the marked ingenuity of some other tribes in reproducing in basketry practically every foreign object seen by them which attracts their attention, so that the few, simple, non-indigenous forms which they do create are scarcely worthy of note. Fig. 8 shows some older types of ollas among which Fig. 8*a* is noticeable. This may be of modern derivation perhaps, on account of its shape, but such freak forms are sometimes very old and entirely of native origin. There are several specimens in the American

Museum collection showing this peculiar double swell. The White Mountain Apache manufacture larger sizes which they do not pitch and which, while not marked by such pronounced stricture, follow somewhat the same lines. (Fig. 15). The specimens photographed in Fig. 8 are quite dark brown from the smoked pitch coating. None will stand unsupported.

The water-proofed ollas are of all sizes and proportions. They range from eighteen to twenty centimeters in height, when intended for children's toys, to jars forty-six to fifty-one centimeters high and as wide across the shoulder, when intended for household reservoirs. The shoulders of such urns are not always appropriately proportioned to the other parts, nor approximately in the same relative position to the rest of the shape in different specimens, nor are the "collars" of proportionate height in all cases. The bulge always occurs, however, in the upper half of the structure except in a few specimens of modern work which indicate their foreign inspiration in more than one way.

The ollas of the pitched variety fall into two classes, the first of which comprises those which cannot stand without support and are mostly all old specimens made to serve as canteens on journeys, or for transporting water from springs and streams to the dwelling. Others with stable bases and squat shapes are used in the house. The former have, on the whole, smaller necks than the latter, but for all of them stoppers are used which consist of bunches of grass. A piece of screen was fastened over the mouth of one large jar of the second type which was being used for native beer. It was held down by a strap tied around the "collar." The owner said this was for keeping out the mice. Old ollas are used for storing grain, beans, etc., but crude coiled granaries, such as are made by the Papago[1] are unknown.

The large ollas of coiled work which are not intended for liquids are very symmetrical and beautiful shapes ranging from nearly sixty-one centimeters in height and almost as broad through the shoulders, to ninety to one hundred twenty centimeters with a diameter about three-fourths of the height. These very large jars are made only by specially ambitious and particularly good craftswomen. There are many variations of these forms, particularly as regards relative height and breadth. The proportions are by no means as constant, as, for instance, with burden baskets. The shoulders have all degrees of slope and occur at almost any point above the center of the jar, though the greatest diameter of one or two specimens lies in the lower half (See Fig. 16*a*). Figs. 16 and 17 give a

[1]Kissell, *op. cit.*, 172–190.

Fig. 15 *a–d* Coiled Ollas from Fort Apache Reservation. *By Courtesy of the Field Museum of Natural History.* Design interpretations: *a*, "*gans* (gods) cross, and lightning."

Fig. 16 *a–e* (1–5179, 5182, 5181, 5177, 5176, 5178). Modern Unpitched San Carlos Coiled Ollas. Design interpretation: *e*, "measure of grain design."

better idea of these forms than can be gained by description and measurements. In Fig. 17, the dimensions of the largest specimen are as follows: height, 44.5 centimeters, diameter of the orifice 20.95 centimeters, greatest diameter through the shoulder 39.37 centimeters. The majority

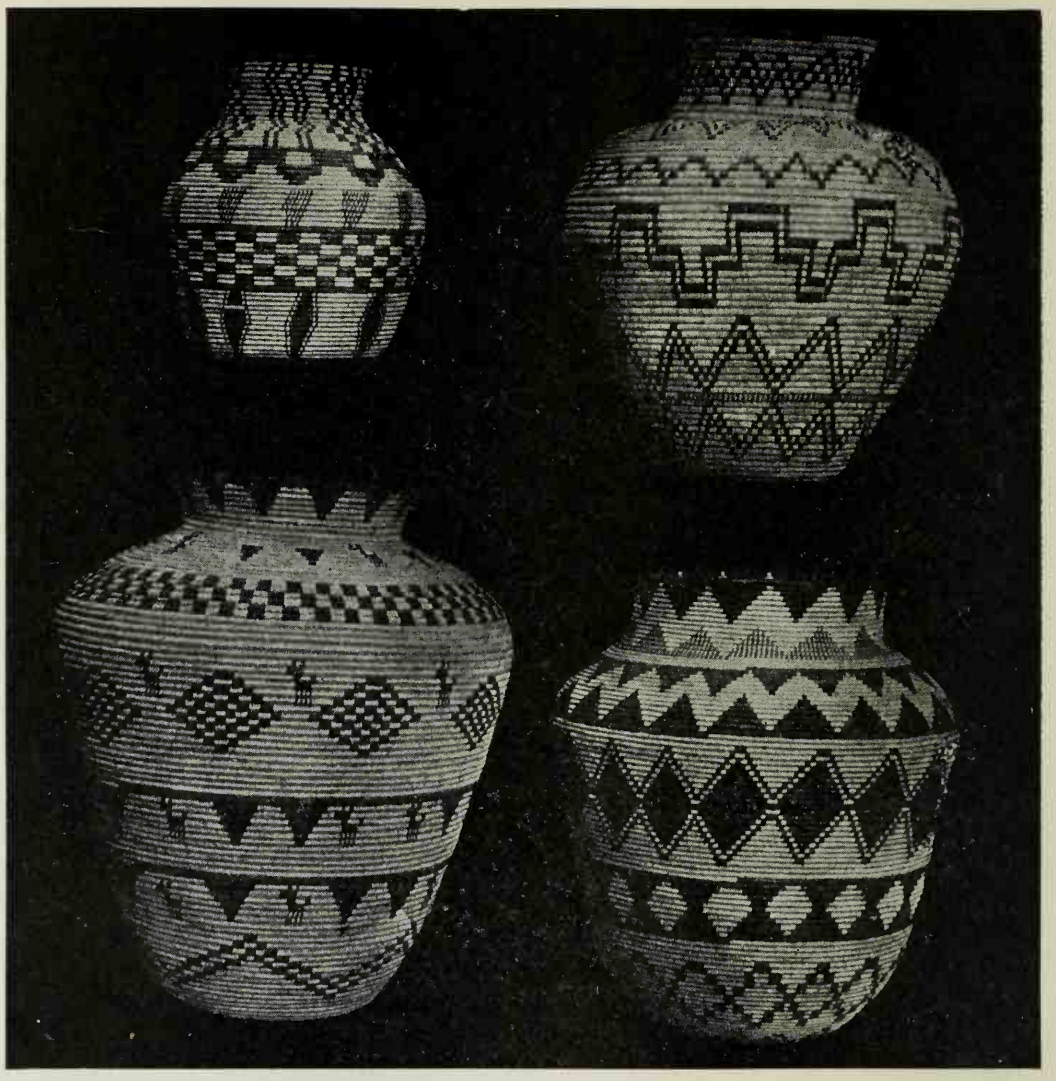

Fig. 17 *a–d* (1–5188, 50–8848, 8849, 1–5183). Modern Unpitched San Carlos and Tonto Apache (*c*) Coiled Ollas.

of the ollas shown in these two figures belong to the Douglas collection made twenty-five or more years ago. The Washington double-coiled specimen, one of the largest ollas ever made on the reservation, shown in Fig. 13, is about twice as large as that for which the measurements have just been given.

The burden basket (*tha tca*), as has been before indicated, is roughly conoid in shape. In depth it measures a little less than the diameter at the mouth, so that the entire shape could be enclosed in a very nearly perfect cube. Of twenty-one specimens measured, three were the same in depth and mouth diameter, two were less than five per cent greater in mouth diameter than in depth; seven were from five to nine per cent greater in diameter than in depth. There were seven with diameters measuring from ten to fifteen per cent greater and one which measured thirty-three per cent more across the top than in depth. This indicates therefore that the mouth diameters of the baskets range from five to fifteen per cent greater than their heights and that there are two slightly different types, one with mouths about seven per cent, the other with mouths about eleven per cent, greater. Burden baskets range from 23 to 36.8 centimeters high and from 23 to 41.9 centimeters across the mouth. The writer has never seen any two-foot specimens such as Doctor Hrdlička[1] has described. The collections in the Field Museum in Chicago are of about the same size and proportions as those seen in New York, but owing to the fact that the cases could not be opened, it was not possible to measure them.

The chief purpose of the burden basket is for carrying wood, but many are stained with fruit juice. The loads, restricted in size by the capacity of the baskets, are more easily managed than those transported by the Pima in their carrying frames, for they are obliged to seat themselves on the ground, if alone, then to shift the basket to the back and to struggle to their feet as best they can.

The smallest baskets are intended for the young girls. In fact, miniatures of all forms of utensils are made for the children who play at attending to all the duties which occupy their mothers. These miniatures are seldom carefully constructed.

The Mescalero Apache burden baskets have about the same proportions as the San Carlos specimens (although they are perhaps a little larger) and it is a rather interesting fact that those of some other peoples do also.

For the third great division of forms, bowls and the like called *tsa niskagi*, no generalization for proportions is possible. Here, as with the jars, all conceivable variations occur, from modern imitations of straight-walled, pail-shaped objects which are sold as waste paper baskets, to sacred meal trays and shallow dishes, measuring 63.5 centimeters in diameter, the rims of which, by reason of very gradual wall slope, are

[1]Hrdlička, *op. cit.*

only 12.7 centimeters above the base. There are also small saucer-shaped ones used to hold sacred meal which are from 12.7 to 20.3 centimeters in diameter and almost flat. It is apparent that the receptacles are made to fit the household and ceremonial needs and that no special standard exists to which they must conform.

About the house they are used to store fruits, seeds, meal, and for individual eating dishes, for soups and stews. When she wishes to parch corn, the housewife places it in her parching bowl together with a few glowing coals and shakes them about. As mixing trays and for cooking, the bowls are in constant requisition and many are charred from being placed too near the fire. With thong loops attached at the rim, they are carried on the saddle to serve as water buckets for the horses. In fact, the Indian woman was formerly never without her basket, in her work about the household or on long journeys. Large and small sacred meal trays are appropriately decorated for the purpose for which they are intended. Some of the smaller specimens are very finely made and approach the Pomo products in delicacy of workmanship.

Here again, as with the other types, the characteristics of the makers are easily detected. The Indians evince traits quite like our own. To some individuals evidently a beautiful artistic piece of handiwork was a joy; they delighted apparently in carefully made, shapely forms, and lavished upon these all of their creative genius. Heavier, cruder, more durable products are the indication of practical, purely utilitarian traits in their makers. Some quite carelessly constructed baskets seem to reveal the slovenly habits of those who manufactured them. But on the whole, the technical and artistic average is very high, and the work so uniform that it seems with few exceptions the result of one woman's labor. This, perhaps, is due to the fact that most of the women, while only employing their spare time in making baskets, are really occupied in this way much more than white women in their leisurely pursuits are occupied with one craft. With the Indian woman, there is usually only one such occupation. This accounts, somewhat, for the high standard reached by so many. In addition it must not be forgotten that it has been carried on for generations and that the younger women profit by the teachings and experience of their mothers.

The series of outline drawings of bowl shapes (Fig. 18) which were based on a collection of about one hundred baskets, furnishes interesting material for comparison with that which Miss Kissell has given for the Papago and Pima.[1] It will be seen that, on the whole, the San Carlos

[1] *Op. cit.*, 196.

forms more nearly resemble those of the Papago who live to the south, than those manufactured by the Pima, who are closer neighbors on the west. They have, however, a greater stability than the Papago bowls; the bases are wider in comparison with the mouth diameter, the walls curve in such a way as to lend a greater appearance of ampleness to the

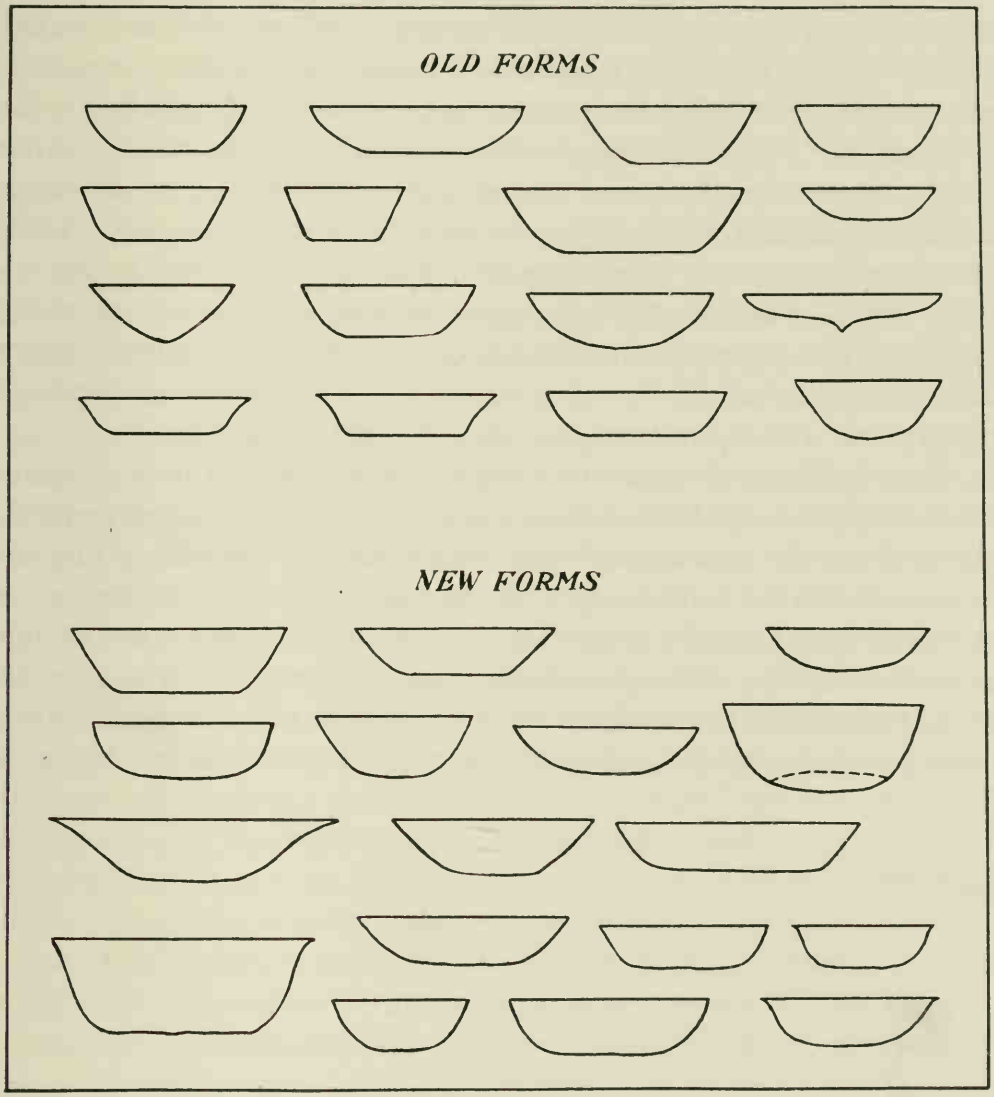

Fig. 18. Outlines of Forms of Old and New San Carlos Bowls.

whole outline, if not an actually different capacity, than that of the baskets of the other two tribes. It would be interesting to know how well this seeming preference for solid, substantial, and generous form is reflected in the character of the people and borne out in other phases of their culture.

Some difference may be noted between the older and newer San Carlos forms, a point which will be referred to again in the discussion of the possibility of a change or growth in the art of basket-making, which may have been carried through a florid period to the present-day graceful forms, fine uniform technique and chaste designs.

In the recent specimens the basket walls generally take a nearly vertical trend, but none of them, even though oblique, are perfectly straight. There is always a gentle and graceful curve from base to side wall, and a slight bulge or in-curve before the rim is reached. Some have both, the latter creating a faintly defined lip in a few cases. Among the new specimens are several with re-curved bases, but, unlike those of the burden baskets, these are symmetrically formed and add to rather than detract from the artistic value. The in-curving walls which are rather common in Pima and Papago examples are rare among the San Carlos. A few old pieces have pointed, curved, or very narrow and unstable bases. In most of these the base and walls merge almost imperceptibly and a sharp flare occurs near the rim. Fig. 14*g* is a basket of this shape. None of these are to be found among the later collections and it is quite possible that they are traded articles which found their way in from the other tribes and whose history has been forgotten. Another reason for considering them as interlopers is the design, a point which will be considered in another section. Fig. 14*f* and *h* are examples the walls of which, although oblique, possess no curves. They are very old, as their blackened surfaces show; and were photographed from the outside, because the designs were indistinguishable from the inside.

ORNAMENTATION

Between the twined and coiled baskets as wide a difference exists in general characteristics as if the two types were created by tribes living at opposite ends of the continent. First, considerable disparity occurs in the materials employed in their construction. It will be remembered that twined ware is made of squawberry, mulberry, or sumac, but only rarely of cottonwood or willow. On the other hand, coiled ware is almost exclusively of the last two woods named. Sumac coiled specimens are rare and little is known about those that have been collected. It is possible that the San Carlos did not make them, and that they are trade objects. Mulberry seems to have been formerly employed for coiling, but has now been completely replaced by cottonwood and willow. Of materials serviceable for working designs, *martynia* is used with both types of weaving, but is never, however, seen on water jars except in rare instances of converted coiled specimens. Yucca, the second naturally colored fiber, appears only on coiled ware.

Paints and dyes are frequently employed for twined ware, but not at all on coiled work. The application of rawhide and beads, silver buttons, etc., is entirely confined to twined utensils, except in the case of small rawhide loops for suspension, which are now and then seen on bowls. Coiled ollas and bowls have no straps or lugs of any sort except in rare instances of "made over" specimens. From the standpoint of purpose the two types of baskets are also distinctive. Twined ware is used almost exclusively for transporting and storing, coiled ware for household purposes and a few ceremonies. Coiled jars are not manufactured even for storing purposes but chiefly for sale.

From the point of view of artistic merit, the twined products, with a possible exception of the mulberry burden baskets, are crude in texture, in decoration, if there is any, and in the colors used for the designs. They are the kind of baskets one would expect to find among a nomadic folk of low culture. The coiled work, on the other hand, is plainly the handiwork of an art-loving people, who manufacture it for its own sake as well as for the purposes it serves. It is the type of work one would expect to find among gentle, industrious, sedentary, peace-loving folk who employ their leisure in artistic pursuits. Their instincts toward beauty are seen to have had some effect on the rougher twined work, not only in the increased fineness of weave on later specimens, but also in the combination of color and material. Rarely is cat's claw or *martynia* used with any but dyed withes on twined baskets, for a sense of fitness apparently

places painted ware by itself. Even when identical patterns are followed, they are executed either with dyed or with naturally tinted material, not with a combination. Some specimens rely for their decoration entirely on alternating bands of different weave. It is therefore almost strictly true to say that except for the *martynia*, which is the all-important design material, the two types of weaving are characterized by practically no common substances, and no common features either in their general construction or in their ornamentation.

In form, the division is almost as striking. Although the olla is developed in both techniques, only the most general resemblance may be noted between individual examples of the two types. Those in twined weave are small and crudely shaped, with pointed or sharply reflexed bases; they are squat, high-collared and have lugs. Those in coiled weave are large, smooth-walled, graceful and symmetrical in shape, are flat-bottomed and without handles. Some have high collars, others graceful lips. The coiled ollas are by no means as plentiful as the bowls, which are really the typical forms in this weave. It is tempting to go one step further and characterize twined forms for this region as deep and more or less cylindrical and coiled ones as shallow and broad, but the modern coiled olla prevents.

Inasmuch as the division in material and form is so sharply drawn for the two techniques, it is interesting to see whether the people have applied similar designs to them. This question of necessity involves only the burden baskets in twined weave since water jars are seldom ornamented even by surface designs painted on them after the ocher is applied. Such designs as are occasionally noted take no regard of the stitches or technique, and because of their rarity and degenerate character are excluded from the discussion.

The Design in Relation to the Field

Twined Work. The possibilities of the distribution of design elements on the burden baskets are not exhausted with the horizontal band which is all the San Carlos use. It would be feasible to create diagonal stripes, which would give the effect of a spiral whorl ascending from base to rim, but such a distribution is never found. Nothing really prevents a more or less vertical arrangement, especially of painted designs, on twined ware, but this too, has not been noted. Naturally a vertical band would tend to weaken the fabric along its edges, on account of the constant introduction and cutting out of contrasting material between the same warps. This could only be obviated by the occasional presence of a con-

tinuous horizontal row of weft for the purpose of strengthening the whole, but would not render the creation of vertical bands impossible. It would merely interrupt the continuity of the line by narrow weft threads which would not be wide enough to spoil the effect. In twined work the warps are apt to lean away from the direction of the weaving, which is anti-clockwise; unless great care is taken to prevent this as the work progresses, the warps take a slightly spiral turn about the basket, so that truly vertical bands would be almost impossible to achieve. A successful attempt would result in a radiating effect of the stripes from the center of the base to the rim, looking down into the basket, while leaning bands, the result of spirally turning warps, would create a whorling effect of the stripes from base to rim.

However numerous the possibilities of decoration, which would also include dotted and all-over effects, the San Carlos craftswoman thinks only in horizontal bands when weaving her burden basket designs, a plan from which she has apparently never deviated. Probably if she were asked why she did not try some other scheme for a change she would be surprised and answer that burden baskets always were made so; at least, this is an answer frequently given to investigators of primitive peoples' customs. She is not necessarily stupid or unimaginative; this she proves in many ways; nor is she lazy and ready to follow the paths of least resistance, for some of her basketry work demands considerable skill and ability to adapt. She merely follows tradition and custom and perhaps the idea of changing it has not occurred to her. After all, Europeans also constantly illustrate how difficult are new departures from old and established procedures.

Coiled Work. In coiled work the possible directions for the distribution of designs are as numerous as in twined ware and more easily accomplished. In following the spiral of the coil a horizontal effect is obtained, while stitches made vertically from coil to coil result in radiating designs which are specially common on bowls, trays and the like. Whorls are easy to accomplish by a combination of vertical and horizontal stitches, while a diagonal distribution results from an equal use of both. All of these possibilities are recognized by the San Carlos in making their coiled ware, if they are not employed in equal proportions.

Considering the bowl first, it has been found that radiating distributions in which the design elements extend vertically from center to rim are the most typical. But one very common design, known as "lightning," may violate this plan. It involves two different principles of structure. In the first, the lightning may be a vertical zigzag made of

short diagonal lines, which may keep its general vertical trend unaltered (Fig. 11*a-d* and Fig. 19*d*). On the other hand, it may be built up of alternating horizontal and vertical lines, which will cause the direction of the whole pattern to trend, as it approaches the rim, either to the right or left as the case may be (Fig. 12). This destroys the radiating effect and produces a whorl. Nevertheless, the underlying idea is that of radiation,

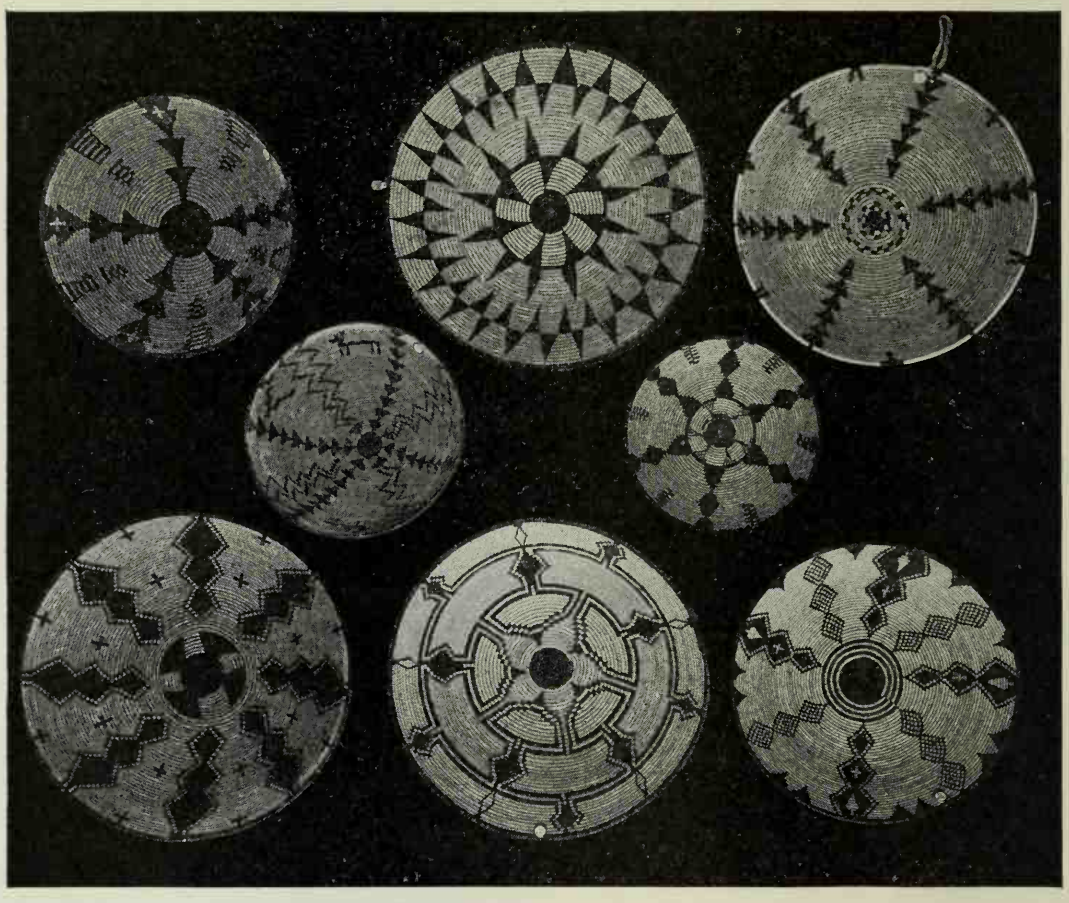

Fig. 19 *a–h* (50–8691, 8703, 8988, 1–5206, 5221, 50–8693, 8692, 8718). Modern San Carlos Coiled Ware Bowls. Design interpretations: *c*, "triangles, cross, people's feet, spotted" (at center); *f*, "cross" (at center); *g*, the pattern was copied from a blanket; *h*, "just to look nice."

although the Indians give to the second type a different name from that bestowed on the former, namely, "lightning going all around the horizon" which is a very free translation. Aside from this second type of lightning pattern, the whorling distribution is not employed. Among the Pima whorling patterns are distinctive and are probably unsurpassed anywhere in the field of artistic design for beauty or complicated structure.

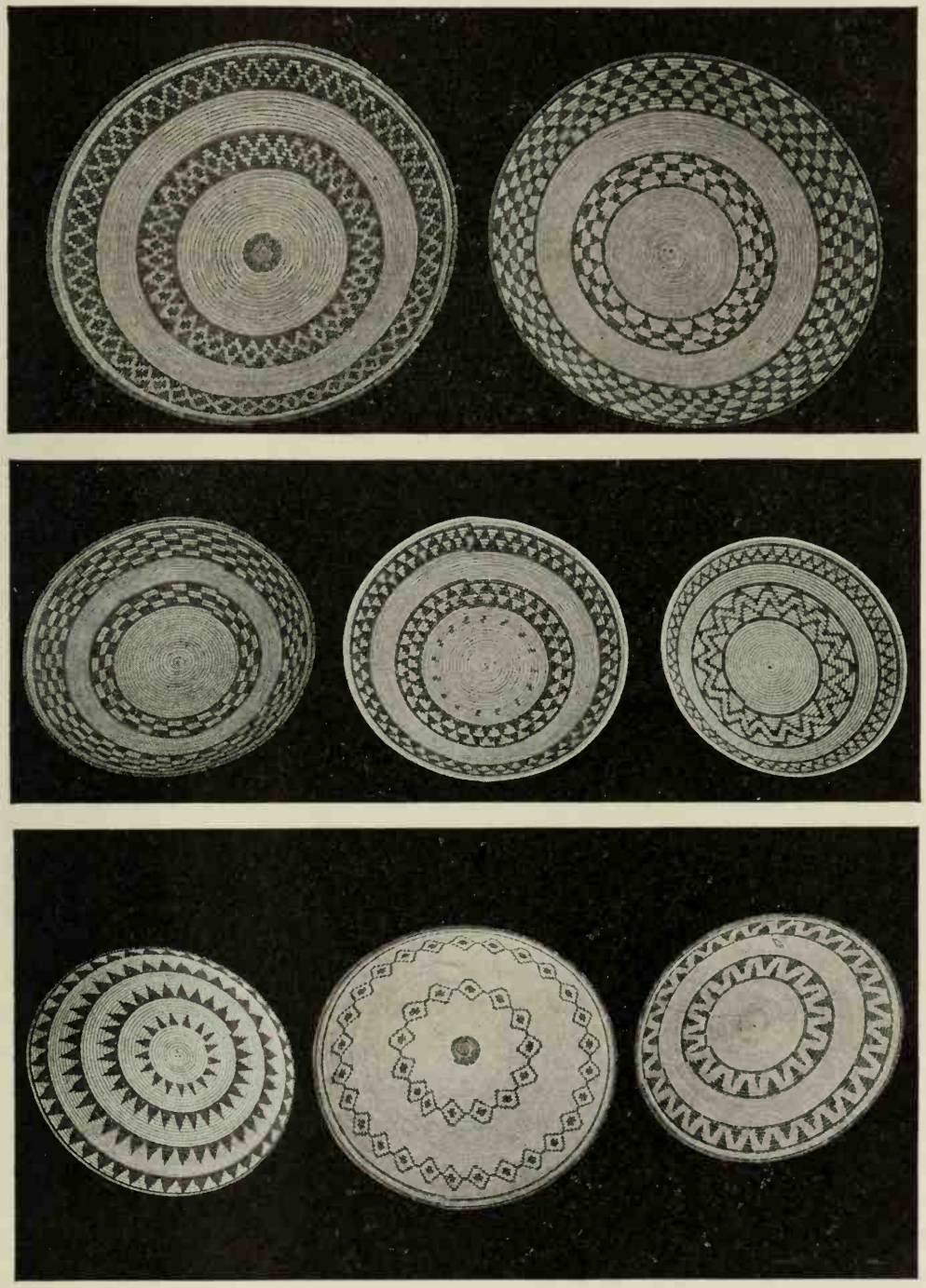

Fig. 20. Chemehuevi Coiled Ware Bowls. *By Courtesy of the Field Museum of Natural History.*

Usually the lightning whorls follow the direction of the coiling. This is the natural procedure and is generally noted wherever diagonal designs and coiling are found together. Exceptions do occur, however. Some may be seen in Fig. 11*b* and Fig. 12*h*. In spite of the popularity of lightning whorl designs, so common are vertical radial distributions that a whorl distribution for designs other than lightning suggests foreign influence in San Carlos art. Naturally, horizontal distributions are very easy to accomplish, perhaps more so than radial. They merely require following the coil, whereas radial distributions work directly counter to

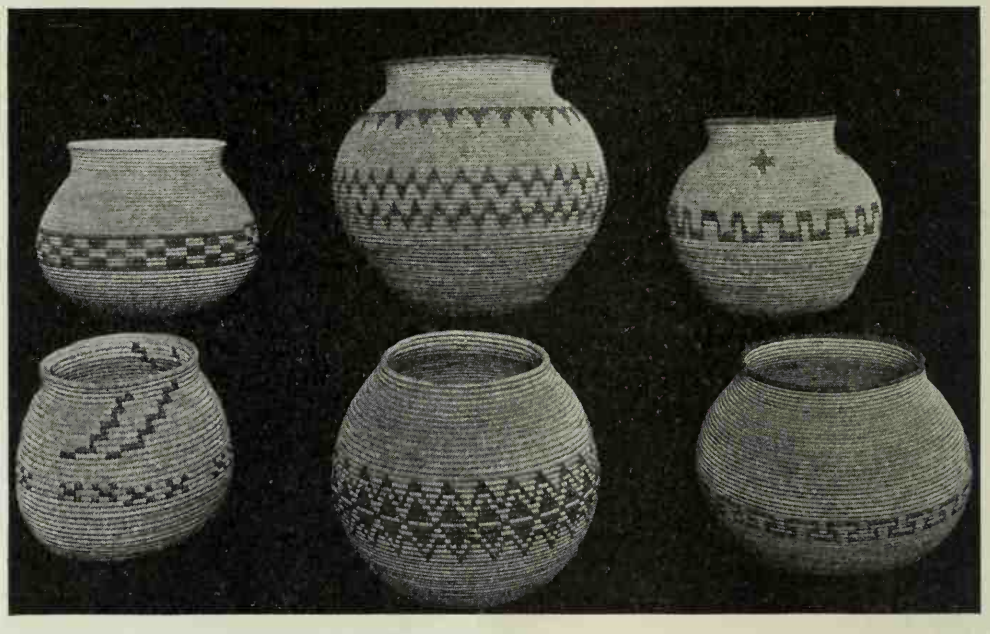

Fig. 21. Chemehuevi Coiled Ware Unpitched Ollas. *By Courtesy of the Field Museum of Natural History.*

these natural avenues and involve very careful placing of stitches over one another in exact vertical alignment. Yet, horizontal bands, except around the centers of bottoms, are rarely seen, and even then are cut up into cog arrangements fully as often as they are left plain. Quite modern work reveals the horizontal band and zone, of which Figs. 9*b*, 10*f*, 11*e* and 19*b* and *f*, are examples. Among the Chemehuevi, living along the Colorado River north of the Mohave, who, it will be remembered, produce work very similar to that of the San Carlos, horizontal arrangements are typical, while radiating or whorling distributions are correspondingly rare, if seen at all. (See Figs. 20–21.) This difference in design arrangement is one of the distinguishing features of the basketry of the two tribes.

All-over distributions are a fourth possibility for decorating bowls but are not generally seen on San Carlos specimens. The predominating design arrangement on bowls is radiation, although no such sweeping generalization may be made concerning it as was the case with the horizontal band on the burden basket. Thus, for the two representative shapes of the different techniques, the typical design arrangements are quite dissimilar.

As might be expected from the "hybrid" character of the modern coiled olla, where a form more common in twined ware is created in a technique usually employed only for flatter shapes, it is on the jars that points of resemblance are found in the general application of the designs usual on both types of weaving. As a matter of fact, three kinds of distribution,—vertical, horizontal, and diagonal—occur in large numbers. All-over or network patterns are also fairly common. They are illustrated in Fig. 16*a*, *c*. On account of its tall shape, the main part of which resembles the burden basket, horizontal bands suggest themselves for the olla and are easy of execution. A glance at the illustrations showing modern ollas will reveal how great is the tendency to either vertical or horizontal arrangements, both of which are suggested and aided by the technique and the shape.

The whorl, or diagonal distribution of designs on jars, starting at the base and rising to the rim, is conspicuous by its absence. A specimen in the American Museum is classed as unidentified Apache, but it is supposed to have come from the San Carlos region. Its peculiar material, —dark brown and split into thick, heavy sewing splints,—which may belong to the sumac family, together with its unusual decoration, mark it as a rare basket under any circumstances, but particularly if it is a San Carlos product. The whorl pattern extending from the shoulder to the neck is the only one I have ever seen on an Apache coiled olla.

To sum up, then, the general distribution of design elements for the various forms of baskets, it seems that certain styles, by no means the only possible ones, have been adopted and developed for the different shapes and types. The burden baskets are distinguished by decorations in horizontal bands usually two or three inches wide. The design elements in these are all found on coiled work, which displays many more that never appear on twined baskets. On coiled ware, however, the typical design arrangements are not the same as on twined work. On bowls the distribution is chiefly radiating, either vertical or diagonal. On the ollas several arrangements seem to be about equally popular: first, vertical lines and series of elements, second, all-over "net" designs,

and third, horizontal bands. We are, therefore, led to conclude that in the most modern and highly artistic of the San Carlos products, a gradual combination of the features of the two kinds of basketry is taking place. The shape formerly constructed in twining only is now produced in coiling and is decorated with patterns seen on both types of baskets. These design arrangements are used by other tribes, although perhaps not on the same kinds of baskets; the California tribes use horizontal bands and whorls, predominatingly; the Salish, vertical, diagonal, and horizontal effects; the Chemehuevi, horizontal band distributions on bowls, and so on. Thus, in the use of various design arrangements, the San Carlos are not unique. Their tribal art traits become clear only when other features are taken into consideration. Even with the limited number of possibilities of basketry decoration, no two tribes of basket makers in the world produce identical styles. To define a style it is necessary to know peculiar combinations of materials, technique, design distributions and design elements.

General Character of Designs

The very nature of the technique of weaving designs into textile fabrics restricts such patterns to straight lines and angles. Only when they are painted upon and across the foundation fabric can true curved lines be attained. Hence most designs on any type of basketry are angular, but apparent curves are sometimes found. The finer the fabric, the less evident to the eye are the small lines and angles which may assemble themselves into semblances of curves.[1] Therefore, the coarser the fabric, the more apparent are the angles and lines composing an outline. Any design the outlines of which run diagonally to the direction of the warp and weft will have a toothed edge. (See Figs. 3 and 4). If the stitches lie vertically or horizontally, straight diagonal lines are impossible, but if they lie on a slant, lines considered diagonal because of their relation to the warp or to the form of the basket, may occur. It will be seen that near curves are at best difficult of attainment. San Carlos work is comparatively coarse. The lower half of Fig. 3 shows the average coil stitch in half size. Nevertheless, curved and floral designs were attempted on some coiled baskets, as a glance at the illustrations will reveal, and the effect is good although the outlines are jagged. Curved designs are never woven on twined ware and for the majority of coiled specimens, also, angular patterns prevail. These are particularly checkerwork, zigzags, triangles, diamonds, and diagonal, vertical or

[1]Holmes, *op. cit.*

horizontal lines. The black circle which usually occupies the center of the bottom of a coiled basket is partly the result of the spiral technique. (See Figs. 9–12, 14, 19, 22.) It is a circular design, strictly speaking, only to the degree that a horizontal band would be on a bowl or burden basket. But it has come to be classed as such because the shape of the basket permits it to be seen all at once, occupying only a small portion

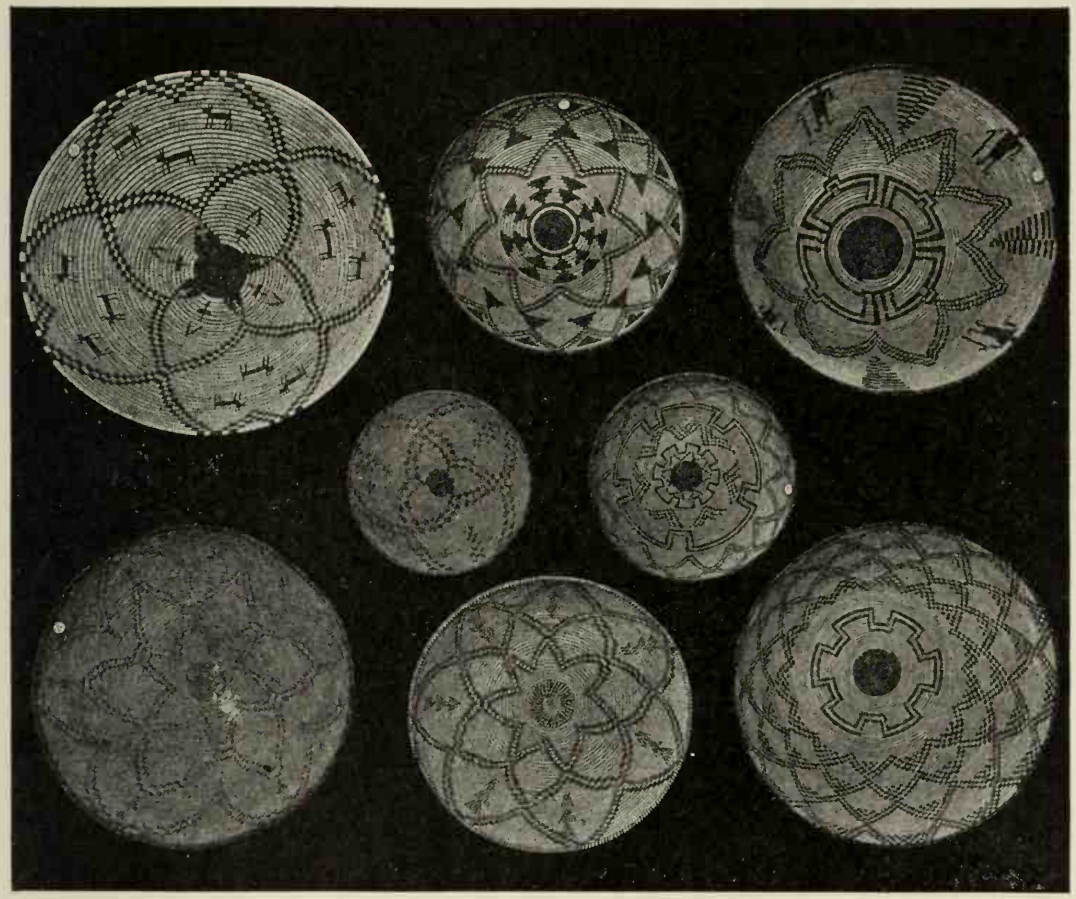

Fig. 22 *a–h* (50–8930, 1–5213, 50–8720, no no., 1–5228, 50–9038, 1–5207, 1–5202). Ancient and Modern San Carlos Coiled Ware Bowls, showing Variants of the Sun Design. Design interpretation: *e*, "the sun's rays, ceremonial points and sun center"; *g*, "triangles, cactus"; *h*, "the sun (center) and rays." The outer crisscross has to do with trade.

of the decorative field, around which other designs group themselves and of which it becomes a part. The Indians think of it as a design and give its variations different names. There is no doubt but that this circular patch has strongly influenced the attempts at curves which traverse the surface diagonally over a number of coils as well as horizontally along the line of a single coil.

Plain diagonal parallel lines are often found in the designs on burden baskets but only rarely on coiled ware except in zigzags, which seem to be of a slightly different derivation. Nevertheless, such lines are occasionally found on bowls and are generally interpreted as rain. All other design elements appearing on the burden basket, such as diamonds and triangles, are reproduced frequently on coiled ware. On the burden baskets the chief distinction is that such elements are always distributed horizontally in bands while on coiled work this is not necessarily the case.

Many of the design elements are found on all the different San Carlos shapes. The burden baskets are the most simply decorated and no elements seem to be exclusively confined to them. They are adorned with rows of triangles, single and opposed, the diamond, checkerwork, and the horizontal zigzag which may have developed from the recognition of the space between horizontal rows of triangles with apices turned inward, or may just as likely have been the primal idea, with flanking triangles as background patterns within the horizontal band. The zigzag is worked solidly or in single parallel lines and is always composed of short diagonals.

While discussing the designs on burden baskets and before turning to the almost completely black designs on coiled ware, it may not be out of place to describe the burden baskets shown in the figures, with the color used in their decoration. The natives have a fine red vegetable dye, mentioned before in the section on materials as being derived from the *ci* plant, which in Fig. 5*a* has been employed for coloring the withes with which the lighter of the two darker shades has been woven. The same basket is pictured as Fig. 6*a*. The very dark portions of the bands are woven in the black devil's claw, while the whitish stripes of cottonwood or willow add greatly to the effectiveness of the red and black. The white appears only every third stitch, for the basket is woven in three-ply twine, each strand appearing at the front and passing over one warp, then behind two, while each of the other two strands pass to the front in turn. That these particular withes were dyed red before being woven may be seen by examining the inside of the basket (Fig. 6*a*). Bands of dyed materials show both inside and outside. The basket shown in Fig. 5*f* is painted, except for the single rows of cat's claw bordering the bands on either edge. The colors are a brilliant Prussian blue for the dark part of the central band and a bright flat red for the checkerwork. The rim is sewed alternately with black and white stitches. The basket is tipped sufficiently in the photograph to show that the blue is invisible on the wrong side although the change in weave, which is often

substituted for the width of the band, shows to rather better advantage than on the right side. This is quite an effective basket although the colors are very crude without even the virtue of being of native extraction.

In the burden baskets the San Carlos Indian gives color full play. It is one of the contradictions of his art that such gaudy specimens should exist side by side with some of the most chaste and refined effects in color and design.

The painstaking effort expended in painting designs may be partly explained by the extreme neatness which the women display in most of their work. Colors carelessly painted over large areas woven in such an obvious technique would result in some very untidy effects, as if the stitches had been entirely ignored. Of this a San Carlos artist would never be guilty. To her, the stitch is very important, as evidenced by its uniform size and execution. On the burden baskets the lack of variety in patterns is more than atoned for by the color, whereas in coiled baskets varied designs relieve the monotony of black and cream (or yellow) which is only rarely enlivened by tiny dashes of dark red on more modern specimens.

Fig. 5*e*, shown again in Fig. 6*b* is decorated entirely in devil's claw designs. Fig. 5*b* is all of one color, although at some time designs appear to have been painted on the bands of contrasting weave. Fig. 5*c* has bands in red, in a three-ply twined weave, with light diagonal strips of undyed wood created by the use of one undyed withe, contrasted with two red ones. The narrow borders are black. Fig. 5*d*, ornamented entirely with *martynia*, is an unusual specimen, because the checker decoration does not form a continuous band. Fig. 5*f* is the painted blue and red basket previously described.

In addition to the design elements used on burden baskets, the coiled bowls and jars present other patterns of a very simple order, such as vertical and horizontal lines, step figures, crosses and "would-be" crescents, the circle (in connection with the coil structure of the basket), small groups of squares, but never the single square, trident figures, H forms, a few plant forms, arrangements of long narrow horizontal blocks, usually light and dark alternating, the hourglass, keystone, Greek cross, various "cog" forms, and human and animal representations. All of these elements not only occur among other North American Indian tribes but are very common, so that the prospect of being able to characterize San Carlos products from this standpoint is indeed discouraging. Nevertheless, it may still be possible, after some discussion

of and acquaintance with the designs, to recognize the outstanding methods of treating the elements and thus to distinguish San Carlos work from that of other tribes.

On the whole, a geometric style of art prevails. The introduction of human and animal figures and most of the representations of plants is recent and these designs are still, fortunately, not to be reckoned with in large numbers. At the present time (1918) human and animal figures are enjoying popularity due doubtless to the interest displayed by tourists and consequently by dealers in their novel forms. The figures of men are more prominent than those of women, although the latter are being made more frequently of late. On account of the difficulty of achieving realistic results with such a technique, human and animal forms are at times almost grotesque.

Because of their importance in the myth or story connected with the human or animal presence depicted on a basket, or because of the interest they have for the weaver as an individual, certain features are occasionally enlarged beyond all proportion, since otherwise they could not be made to show. The single stitch is the smallest medium available and is usually too coarse for detail work. Thus, a man, to be recognized as such, must have a head, trunk, and legs. Rarely arms may be omitted. The significance of isolated parts of human figures such as feet, is still a mystery. On one or two baskets only the feet appear. The rest of the body is missing. On a small bowl, feet, to be distinguishable, would necessarily be large in comparison with the rest of the figure. Fingers and toes, where white stitches must necessarily alternate with black in order that the fingers may be recognized as such, are usually out of all proportion to the body as a whole. Arms, to show when hanging by the side, must be separated from the body by at least the width of a vertical row of single white stitches; when the arm is only two stitches wide, it must hang from a shoulder which projects in an uncanny fashion. In being bent diagonally, the arm composed of an oblique line of stitches assumes a most unnatural toothed or jagged appearance. Because of the limitations of such coarse technique, all human figures reproduced on coiled work and other basketry products look more or less alike,—stiff, angular, out of proportion, with usually only those parts appearing which identify the object. In the basketry of many areas a woman is distinguishable solely by her dress. Doctor Holmes in discussing attempts at realistic representation in basketry says:—

> So pronounced is this technical bias that delineations of a particular creature—as for example, a bird—executed by distant and unrelated peoples are reduced in corresponding styles of fabric to almost identical shapes.

While this is true, Doctor Holmes' argument seems to support a hypothesis that on this account animal figures are necessarily alike in all coarse basketry work. I cannot wholly agree with him on this point, for simple as the bird figure is, it is possible to vary it, as it is to differentiate animal or human figures in small particulars. One finds the bird in one area almost always in profile, in another with outstretched wings, and where in the same position in two different areas, some trick of tilt of body, direction of tail, etc., may serve to differentiate the products of two localities. The San Carlos cock is unmistakable, on account of its upstanding tail. Human figures are introduced often in the imbricated coiled baskets made by the inland Salish of British Columbia. These must be built up of small rectangles, each a separate imbrication, just as the San Carlos build from single stitches. Yet on baskets from the two places they are quite different in general aspect.

With such quadrupeds as dogs, horses, coyotes, wolves, and others which have no distinguishing features, the problem is less easily solved, but deer are nearly always recognizable by their horns and cloven hoofs. Yet some tribes do not put any stress on the hoofs, others emphasize the white tail, etc.

The San Carlos women are very ingenious and original in combining the comparatively few geometrical elements that they seem to know, so that, except for bowls bearing so-called "lightning" designs, one rarely finds the same pattern twice, although frequently a general resemblance may be noted which is hard to define. Even lightning designs are seldom exactly alike, so numerous are the possibilities of varying the numbers of parallel lines, their proportionate width, the length of horizontal and vertical parts in relation to one another, the number of angles, the size and kind of checker, and so on. Figs. 9, 11, and 12, which show a number of these baskets will illustrate how many variations of a single idea are possible and how well they have been worked out.

To describe an art style in a way that may be comprehended by those unacquainted with it is by no means an easy task, especially if the style is complex. Aside from the characteristic arrangements of designs on the different forms of baskets there seem to be also very typical kinds of elements employed. A study of the illustrations will reveal that the square or its closely related figure, the rectangle, are entirely absent as separate figures and are only seen in some sort of checker formation. On ollas such rectangles sometimes assume unusually large proportions compared with the size of the basket, but generally speaking they are subordinated to the checker idea and play a comparatively insignificant

part in the decorative scheme. Right-angled figures, however, may be seen in Fig. 10*d*, Fig. 17*b* and Fig. 19*g*. The various cog circles surrounding black centers, as well as crosses and "lightning" designs, are common. But frequent as these are, they are far outnumbered by diagonal figures or those produced by a combination of diagonal with vertical and horizontal lines. Vertical and horizontal lines are less frequent than the diagonal ones created by "step" stitches. When they do appear, except in "lightning" designs, they play an inconspicuous part in the decorative scheme.

On the other hand, one is impressed by the prevalence of intersecting diagonal lines forming so-called sun's rays which look like the petals of a flower, and by the zigzags traversing the walls in diagonal directions, as well as by the number of triangles and diamonds appearing in vertical or diagonal series, by the hourglass figures which are evidently by-products of the series of opposed triangles joined at the apices, or by diamonds arranged in horizontal bands. The triangle and the diamond are the two conspicuous simple geometric figures and, when arranged in vertical series or when cut in half vertically as in Fig. 11*f* remind one of Plains art. The radial arrangement of ornamentation, of course, as seen on the bowls, is on the whole foreign to Plains art, where most of the decorations are on rectangular parfleches and pipe bags, and present chiefly vertical or horizontal divisions of the field, although there are a few striking exceptions such as radiating designs on buffalo robes and on the beaded discs on blanket bands.

We have seen that diagonal elements also prevail on ollas and burden baskets to a marked degree, so that at least on this point the entire San Carlos art agrees. Its selection of elements agrees also with that of the Plains, Plateau, southwest California, and some Northwest Coast regions. There are, however, groups living north and south through the Rocky Mountain basin, of which the Chilcotin in the north, the Shoshoni and Navajo in the center and south, are cases in point, who use the square or rectangle prominently in the decoration of skins and baskets.

Small isosceles or equilateral triangles are used by the San Carlos in great numbers, executed solidly in black. At times they are outlined by a single row of black stitches separated from the solid triangle by a row of background stitches, but only on two sides,—a curious circumstance. In this particular art it might be accounted for by the fact that the horizontal outline would necessarily be as wide as a coil, which would give it undue prominence. Yet in other areas, particularly on the Plateau where the width of coil could not be adduced as a reason for the omission of the

base line, the triangle is often treated in the same manner, or a whole triangular figure may be composed of chevrons set one within another.

Larger triangles and truncated forms appear in solid black or in checker. Checkered triangles are executed either in single alternating black and white stitches or in quite small squares of several stitches each. One olla showed a triangle of black and white vertical stripes. The triangle in outline only has not been noted. Triangles may point up or down. In vertical series, however, they seem to point down only. They are found on burden baskets and ollas in opposed horizontal series, apices turned inward. On bowls, when horizontally arranged, they either point down or else the bases lie along a horizontal line so that they point up and down alternately, but so far few San Carlos examples have been seen where they point upwards only, as they do on some Chemehuevi bowls, for instance (see Fig. 20). Equilateral triangles are sometimes arranged diagonally with the right or left edges all in a line (see Figs. 25, 26). This reminds one of certain styles in California basketry, particularly Pomo, and Klickitat.

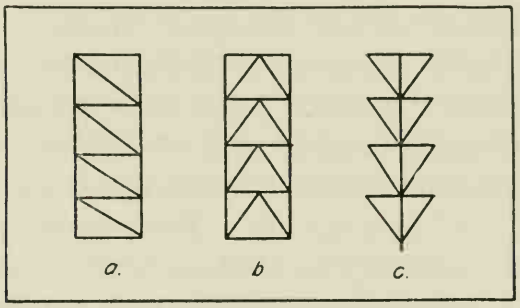

Fig. 23. Variants of Superimposed Triangle Designs.

One peculiar type of triangle appears in this region but the links indicating its logical development, such as occur in the art of some other areas, are missing. From this circumstance and the fact that it is very commonly used in Plains and Plateau art, one is almost forced to the assumption that it was borrowed outright from northern and eastern neighbors. This is the right-angled triangle with one of its smaller angles pointing down. It never appears alone, but only in a vertical series, with the long sides aligned perpendicularly. The series may face either way, with the straight line lying to the left or to the right. The right-angled triangle in Plains or Plateau art has evidently been derived from the subdivision of vertical strips of decoration bordered by lines, into various forms of triangles. The subdivision is accomplished in several ways. One is by diagonals crossing the strip from side to side. Some strips have only this division, but others have a further step, connecting the points of contact of the diagonal with the vertical lines by means of horizontal lines cutting entirely across the strip. See Fig. 23*a*. This results in two dove-tailed series of right-angled triangles, the left series pointing up,

the right down. Another is by means of a series of superimposed triangles enclosed by parallel vertical lines touching them along the angles made with the bases (Fig. 23*b*). Here the right-angled triangles flank the central series on either side, as resulting background. To obtain in this manner a series of right-angled triangles pointing down, the superimposed isosceles triangles must point up. Triangles pointing in this direction are not found in vertical series in San Carlos art, as has already been said, nor in any series uninterruptedly, nor is the vertical strip of decoration found except when composed of checker work. Even then it is seen only on very modern shapes. The vertical line is almost as rare and is never associated with triangles. Hence the derivation of vertical series of right-angled triangles, as indicated in Fig. 23*c*, is highly improbable in the history of San Carlos art. To call the vertical series of right-angled triangles described above "half triangles" seems justifiable. The Indians themselves have indicated the idea of division in their term "half-arrowhead" and the like. These right-angled series are equivalent to half of the ordinary vertical series of isosceles triangles pointing down, but the question arises as to how they may have become so divided, since vertical division of any series of figures, such as is illustrated in Fig. 23*c*, is not practised. The only plausible explanation is that they were taken over bodily from some foreign art as divisions of the series of "full" triangles, since they never appear singly.

From the triangles it is but a step to the "arrow point" with a stem, which is also often seen here, in black, checker, or white on a black ground.

Two triangles, base to base, the one executed in solid, the other in checker, form the diamond in general outlines, but diamonds in solid black, checker, or merely outlined by rows of single stitches are also seen. There is no reason to suppose that they were derived from a combination of two triangles, any more than that they were formed by intersecting diagonals, or taken outright at some early time from a foreign source. The diamonds appear singly, in large or small sizes, depending somewhat on the size of the basket on which they are placed. When separated they are ranged horizontally. They are also seen in vertical series, with points connecting, and may be executed merely in single outline, in a series of outlines enclosed one within the other, in solid black, outlined, or in checker.

The hourglass is less frequent. This is a very prominent figure in Plains art. Among the San Carlos it appears alone, in horizontal arrangement alternating with diamonds, where it may be considered merely as a

reverse figure or as a design element, and in vertical series, probably the result of diamonds with merged points. See Figs. 9, *a*, *c*; 10, *d*; 11, *f*; 12, *g*; 16; 17, *d*; 19, *f*, *h*.

The pentagon as a figure does not appear.[1] The hexagon is found only in outline, surrounding diamonds on ollas. It seems never to have been recognized as a possible element, and certainly in the connection in which it is used, is merely a truncated diamond. In fact, the history of the hexagon in several areas, among the Salish, for instance, in British Columbia, is apparently the same, although there it has come to be used alone. Several ollas in Fig. 16 illustrate its use. In all-over "mesh" or "net" designs the octagon is a common result as an outline of the diamond, but it does not seem to be present in San Carlos art. Horizontal truncation of figures is of frequent occurrence, but the vertical truncation is apparently absent. Other figures are of too infrequent occurrence to be considered as typical, and may best be learned from the sketches (Figs. 24–27). They appear occasionally.

Subdivision and Adaptation of Elements. Little supplementary treatment of simple elements occurs except by composition. Subdivision of the figure into smaller fields is rarely attempted. The triangles and diamonds are worked in solid colors, usually black, since cream is the background, or more rarely in checker, or the diamonds merely in outline. It has already been said that black figures are sometimes finished with outlines composed of a single row of stitches, but that when triangles are so treated, which does not often happen, the peculiarity exists of surrounding two sides, but not the base, thus enclosing the element in a chevron. The diamonds are often outlined, but as they are so closely joined, there is no room for the outlines to converge to points above and below the elements, so that the diamonds appear to merge into one another and form hourglass figures. On account of its greater surface, far more liberties are taken with the diamond than with the triangle. Sometimes crosses or small arrow points in white are worked in the center, or the diamond may be executed wholly or partly in checker. Triangles enclosing smaller designs were not seen. Diamonds are apt to be graded in size in a vertical series to suit the form of the basket. On bowls, for instance, those nearest the center are small, the others increase in size toward the rim. A curious exception may be seen in Fig. 10*d*, where the peculiar rectangular design, suspiciously like the very common "head" or "mouth" pattern on the basketry of the Lillooet and Thompson Indians of British Columbia, takes precedence, and the diamonds are adapted

[1]Five part divisions of the field on bowl shapes are fairly common.

to it. Fig. 10*b* shows a graduated triangle pattern. On ollas the same treatment of elements obtains. (See a number of examples in Figs. 16, 17.)

This adaptation of size of design to the form of the background field illustrates clearly that the San Carlos artistic sense is of an unusually high order for people of their level of culture. Their nice feeling in regard to filling the field offered is evident in practically every specimen. Where it has been necessary to fill in between "lightning" zigzags which are too far apart in places, the section of zigzag so interpolated is seldom conspicuous, but appears to belong to the whole design, even where it may occur only on one side. It may be very difficult for a worker to give a line the exact trend that it should take, particularly in a "lightning" zigzag which in its whorl eventually comes to the rim far to one side of where it begins. It requires a good artist with a keen eye for lines and a vivid imagination to know just where to place these and where to put the stitches at each successive round to keep the proper trend until the design has been sufficiently far advanced to afford basis for comparison. In the bowl shown in the center of Fig. 12 the lines have been corrected again and again near the center in order to keep them radiating in four directions equidistant from one another. The baskets pictured to the right and left of this are extraordinary examples of spacing. Whatever may have been the knowledge of mathematical principles on the part of the women who made them, and no doubt it was very limited, any psychologist would admit that they possessed the capacity for visualization to a marked degree, as had the woman who evolved the basket shown in Fig. 22*b*, with its nine-part series of double triangles around the center, its seven-part zigzag radiating "petal" effect, and its thirteen-part border arrangement, all so adjusted that their combination produces a whole that is entirely satisfactory to our sense of proportion. For a basket of given size the women sense the limits in size of designs that may properly be used on it in connection with others. Thus a basket like this is probably not so much the result of a preconceived plan to combine a zone of nine elements with others of seven and thirteen, as meeting on a circumference a necessity in spacing as many elements as demanded by the proportions considered suitable for that particular zone and the basket as a whole. The size of the elements selected controls, to a large extent, the number that will have to be used, but they must be visualized beforehand, because all must be started together on the lowest coil where they appear.

Summary of Characterization of Style

To summarize briefly the characteristic points of San Carlos art style as evinced in basketry, it is necessary to put first the typical distributions of elements for the different forms and techniques. Horizontal, vertical, diagonal, whirling, and all-over arrangements all find their expression in more or less prescribed ways. Even the concentric arrangement is not altogether lacking, while radiating distributions of elements are very common. The statement that these various arrangements are known and used must always be attended by qualifying remarks as to basket types on which they appear, for otherwise it is valueless. Water jars seldom bear designs. Those on burden baskets lie in horizontal bands. Those on coiled bowls are chiefly radiating in distribution from the center to the rim, whirling, or in vertical alignment. Those on coiled jars are distributed in horizontal or vertical stripes or occasionally in a mesh or all-over pattern.

Simple elements, separated and scattered over the surface, are not common. On the other hand, they are often seen in series or prescribed arrangements. In other words, the single element has become fairly well reduced to design formation. When appearing alone, unrelated figures are practically always used as fillers in spaces which have by miscalculation proved to be too large. Very rarely they also appear as symbols in semi-realistic work.

The square, except as it occurs in checker work, is absent. So, likewise, is the rectangle. Right-angled figures created by the intersection of vertical and horizontal lines are very inconspicuous except in the "lightning" designs and cogs. On the other hand, diagonal elements are characteristic and most commonly represented by the triangle and the diamond as well as by the large number of patterns created by the intersection of diagonal lines, which remind one of the petals of a flower.

When figures are arranged vertically, as is often the case in coiled ware, and this includes the radial designs on bowls, they tend to be graduated in size to conform to the increasing area of the design field.

The simple elements are usually not subdivided in any way except into checker work; more often they are represented in solid black, and rarely, some of them are merely outlined. Attempts at circular figures, which are not the result of following coils, are never seen, except for the "petal" effects.

SPECIFIC DESIGNS AND ELEMENTS

It would be a difficult matter to assemble in tables all the design elements in use by the San Carlos, without the examination of many more specimens than I have been able to obtain, even though it seems fairly certain that there are relatively few employed. In the illustrations which have been prepared, Figs. 24 to 27, the most typical are reproduced. It must be remembered in examining the sketches that all horizontal and vertical edges of designs are straight and that all diagonal ones are "saw toothed," although except in small figures this circumstance would make no material difference in the general silhouette of the element. A triangle only two coils high and two stitches wide at the base would be noticeably

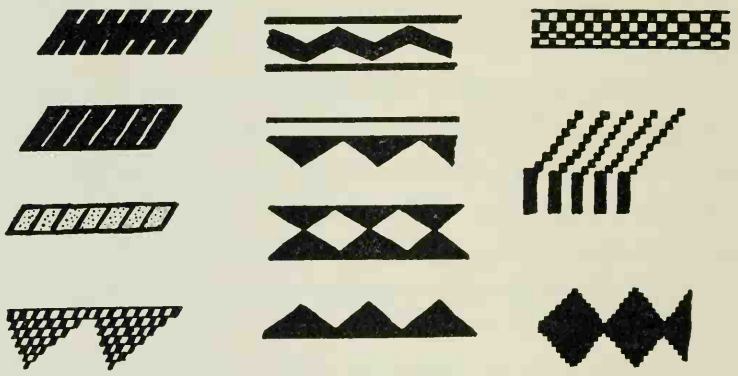

Fig. 24. Designs on San Carlos Twined Ware Burden Baskets.

affected by its "step" formation, while larger figures would not. A few very small elements occur which are markedly altered in this way.

The elements illustrated in the sketches are grouped as found on the three main shapes. Practically all of these figures are widely used over North America, as has already been indicated. If a detailed study could be made of the decorative art of all the tribes and the design elements assembled for comparison, some interesting developments would come to light on Indian art history and the processes of "reading in" meanings which differ in various localities for the same element. The cloud or tipi pattern which is also interpreted as a mountain or bear's claw is an illustration.

In the collection of elements no account is taken of the black painted designs seen on twined pitched water jars. They consist of dots and hearts arranged in necklace fashion about the neck or shoulder of the jar and probably are representations of native or European ornaments.

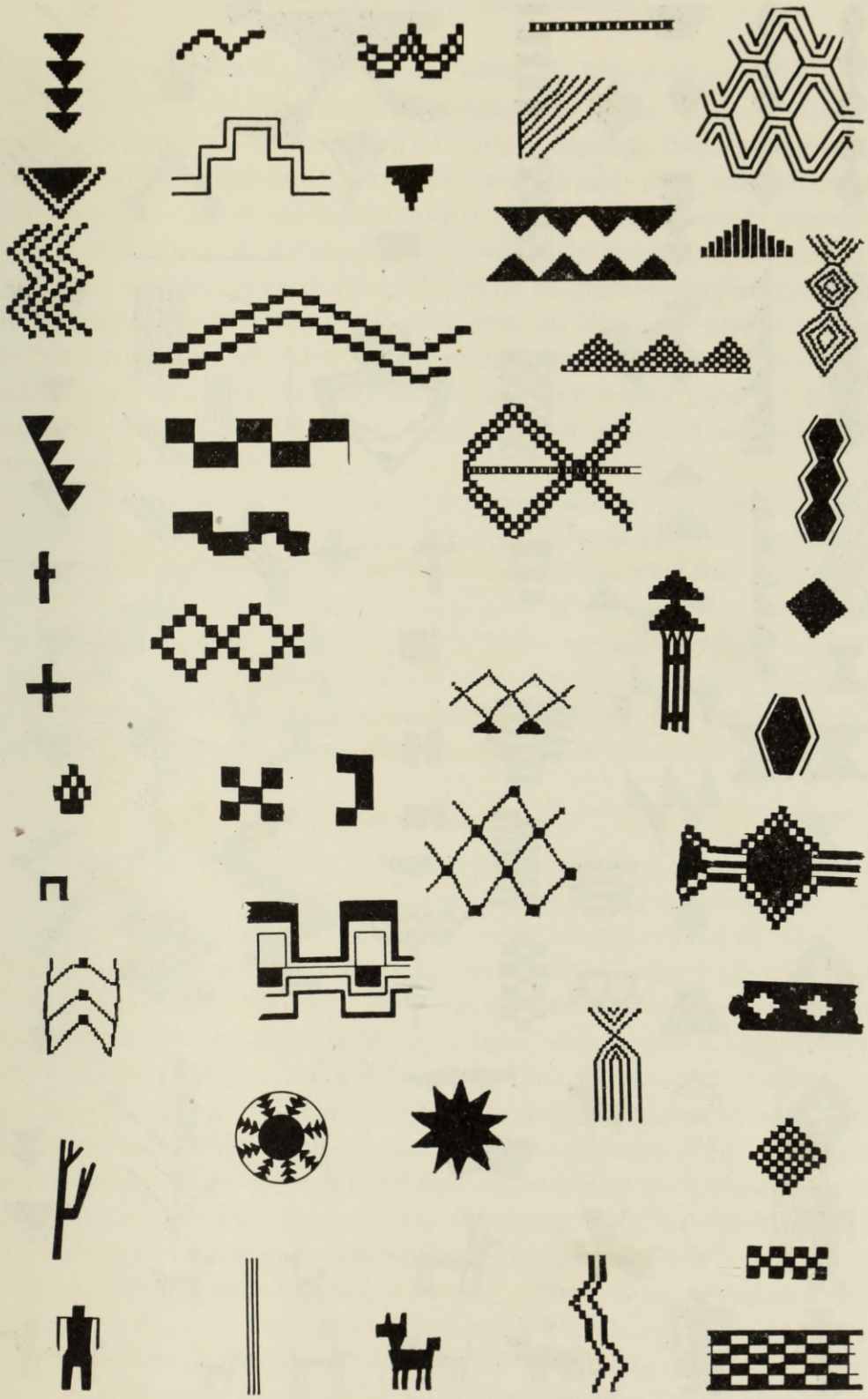

Fig. 25. Design Elements taken from San Carlos Coiled Ware Ollas.

Fig. 26. Design Elements taken from San Carlos Coiled Ware Bowls.

It will be seen that all the design elements found on burden baskets likewise appear on at least one of the other two forms. Fig. 24 gives the common elements for these shapes. The parallel diagonal lines, the triangles, and the zigzags are always very simple, with few variations, except in color. They are consequently always in good taste, according to our standards. On some ollas and bowls the diamonds and triangles are perhaps slightly more elaborated, yet on the whole simplicity prevails. Fig. 25 gives the elements commonly seen on ollas. A number of new ones will be noticed and also rearrangements into vertical series of some already depicted. Outlined figures are also seen which were not present on burden baskets, as well as representations of men, and rarely realistic figures such as the cactus.

On bowls, some of the design elements of which are given in Figs. 26, 27, ample proof is afforded of San Carlos art in its flower. Numerous animal figures, as well as many variations of simple geometric ideas, will be noted. Fig. 27 is devoted to the variations of sun patterns taken from specimens illustrated. Doubtless many more variations might be found in different collections which have not been covered by these few sketches. The "sun center" themes are occasionally placed on the bottoms of ollas. Two of these are given with the other olla elements in Fig. 25.

Interpretations

Information concerning the meaning of the individual designs on the burden baskets, to return to these, is practically non-existent. Apparently the few patterns that have become standardized as "proper" for their ornamentation have long since lost any particular meaning they may have had originally. The burden basket is the most utilitarian of all the forms existing at the present time, and, on the whole, receives the roughest treatment. It is quite likely that the designs are put there "merely to look nice" as one women expressed it in regard to one basket. Concerning these every-day receptacles the people seem quite unimaginative. Possibly a poetically minded individual would read into the broad zigzag of a horizontal band, or the resulting triangles flanking it on either side, the meaning of mountains or clouds, so often given, but on the whole this tendency to read in is rare. The general attitude toward such designs may be expressed perhaps by the description given to a checker band on one basket by the vender who, being asked to interpret it, said that it was "spotted," a remark which was very enlightening! A straight band was interpreted as "one line." Evidently these were either cases of refusal to give up the secret, or what is more likely, there

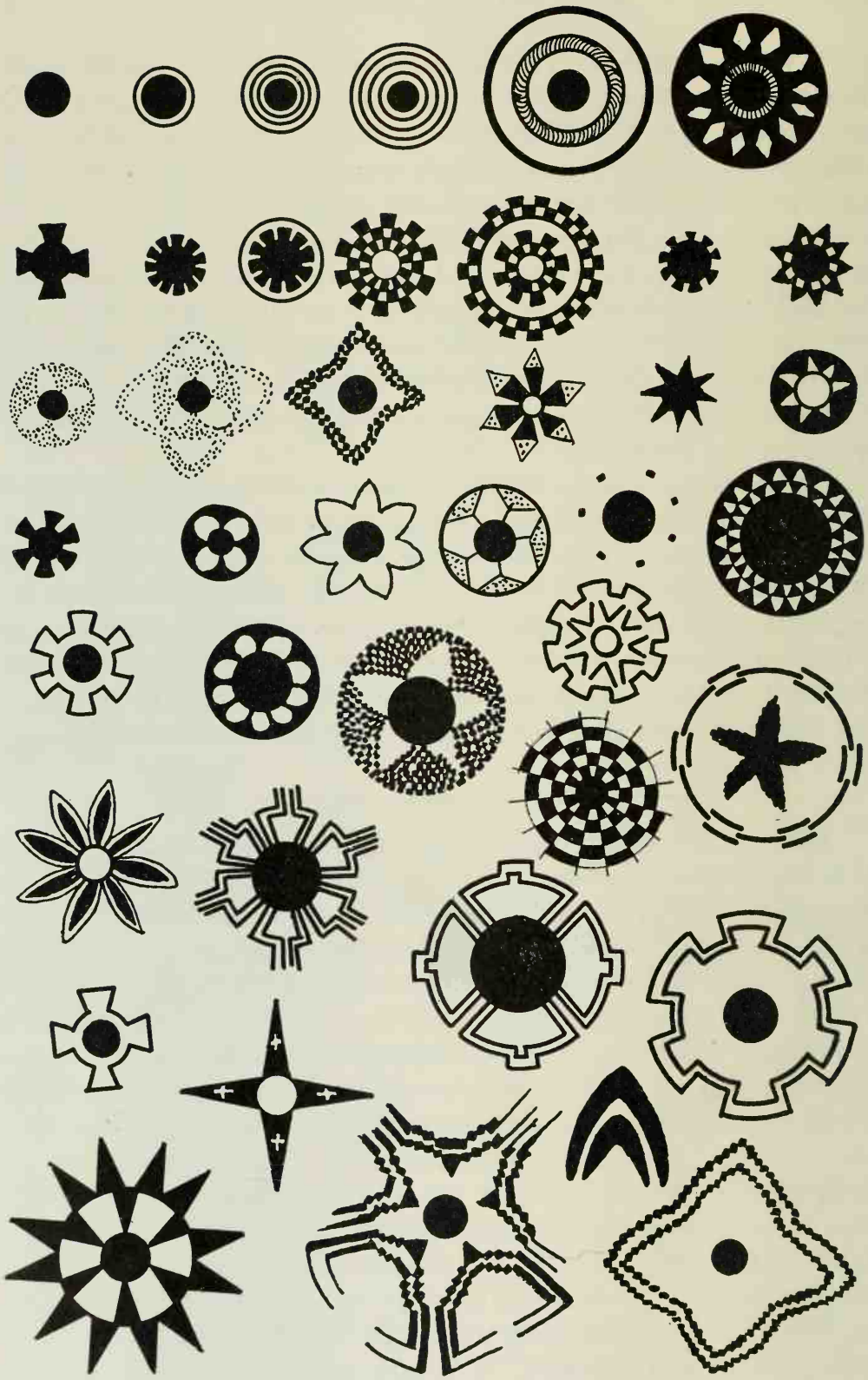

Fig. 27. Variants of the Sun Design taken from San Carlos Coiled Ware Bowls.

was no secret. Such meanings as the designs may once have had are lost for such common ware as burden baskets.

The decorations on coiled baskets are sometimes composed of figures quite unrelated artistically, such as a combination of geometric and realistic elements. These may be interpreted separately or together. When together, they generally illustrate a myth, story, or religious idea; separately, they are purely matter-of-fact. From the interpretations gathered and the impressions gained of the people by the investigators who have visited them, it appears that they really are more inclined to commonsense than to fanciful explanations. Yet certain fragmentary interpretations make these impressions seem erroneous at times, and indicate that the people either are inconsistent or else delight in giving expression to the first thought that comes to mind in order to mystify the curious questioner. Such is the explanation given for the designs in Fig. 19*c* where triangles, the cross, people's feet, and a spotted figure around the center are all mixed together in a relationship that is to us unintelligible. That given for Fig. 10*a* is an example of a connected interpretation representing a religious idea where first, necessarily, is the invariable center, then some radiating designs which have been borrowed from sand paintings used in ceremonies, then a circle, also a sand painting figure of *gans* or gods dancing, with their trails and tipis at the rim. This design is very well proportioned and rather unusual in its consistency in the fourfold repetitions of figures, for four is the sacred number of the tribe and is present here in every part of the design. Fig. 12*g* is an illustration of a number of unrelated design elements,—that is, unrelated from an artistic point of view,—of which the interpretation given evidently relates to a myth or story. It is called "wandering with animals." "The four checker-like places indicate the way out." Here the paths and lightning represented by the zigzag line are repeated, the paths four times, the lightning five. The animals are repeated in varying numbers. The placing of the two men depicted does not conform to the rules of conventional design nor have the cocks been treated in an entirely artistic manner. This is one of those examples where certain elements are reduced to stereotyped arrangement, yet appear in connection with others in which the representative and dramatic factors are of more importance than the artistic.

Fig. 9*b* is an illustration of unrelated design elements which are more nearly confined to stereotyped treatment. In the last zone the variations are due doubtless to incorrect spacing of the inverted triangles which in two places were farther apart than elsewhere. It was evidently deemed better taste to insert extra figures than to leave spaces.

The people seldom reveal in their baskets the fact that the number four is with them of highly religious significance. In Fig. 10 are pictured several specimens showing various rhythms, one in six, another in five, another in five and four mixed. In fact, a love of complicated and syncopated rhythms is often demonstrated. The more one studies their masterful handling of intricate rhythms the more one is convinced of the women's preference for these over the symmetry to be had in simpler effects.

It is to be regretted that for so many baskets photographed here no accompanying interpretations of the designs were obtained from their venders or markers. A large number belong to old collections made before the need became apparent of securing all possible data about specimens from their makers. Now, if direct study of the people who are either gone or are rapidly dying out has become impossible, anthropologists must attempt to reconstruct the history of their cultures from what relatively imperishable material evidence they have left behind them.

It would have been a great undertaking to photograph all baskets for the designs of which interpretations have been secured and the perusal of so many would have been tedious for the reader even though some interesting psychological material might be the result of such a study. But extended research of this kind belongs primarily to a résumé of the art of all North America with the object of tracing its historical development.

The interpretations secured for the baskets presented in the illustrations will be found in the captions. They were taken from field notes made by the collectors of the specimens. It is difficult to generalize concerning typical interpretations of similar designs either in individual tribes or for a wide region over which similar design elements prevail, because of the tendency of individuals to read in meanings according to their personal fancies which may be momentary, and because to some extent it is true that tribal differences exist in the interpretations generally given to similar patterns. The so-called lightning designs of the San Carlos are not invariably so interpreted by all tribes where they occur although lightning may be the most common meaning assigned to the design. Lightning is generally depicted by some kind of zigzag lines or checks, but a forked figure might also be interpreted as lightning as well as tree, and even zigzag lines which look quite alike may take on widely varying meanings not only from tribe to tribe but even within a single group. Thus the design on the large olla, Fig. 16*e*, was interpreted

by a San Carlos as the "measure of grain design" and represents grain falling from the measure at the top, much as it might fall from a woman's winnowing basket. But the design is hardly distinguishable from lightning designs so common on bowls and trays, and the triangle which was by this man interpreted as a measure might be said by another to be a cloud. It all depends on the point of view when it comes to designs which are not realistic but merely suggestive.

However, the vertical zigzag interpreted as lightning is widely found, probably because it suggests a natural phenomenon which often strikingly assumes this form. Similarly, triangles may be interpreted as representing several objects roughly of this form which are constantly being observed by the people, the most conspicuous of which are arrowhead, tipi or house, mountain, or cloud. The preponderance of one or another interpretation may vary from tribe to tribe, or certain meanings may never be applied in certain groups, but there is probably not a single tribe using these suggestive but utterly conventional design elements where only a single interpretation would be found for any one of them. On the other hand, it is quite as instructive to note the number of variations of a design to which, nevertheless, the same or roughly the same interpretation will be attached. Thus some of the forms of the lightning design may be seen in Fig. 14*a* and probably Fig. 14*b* also in Fig. 11*c* as well as Fig. 12*d*. Modifying terms are given for different aspects of lightning and applied more or less to variations of the vertical zigzag. In the notes available on the subject the following expressions are found, for which, unfortunately, design illustrations have not always been procured, but few as they are, perhaps there are enough to illustrate the fact that differences are recognized by the people, not only in various types of lightning as they exist in nature, but also as they are depicted in their art. *Nol* is the stem meaning lightning, but it does not always appear in the term. The direction of the movement of the lightning seems to have been the principal thought.

Lightning Terms

di geon dlL'y (50–8752)[1]	Fig. 11*c*
nol L ici, lightning all around (?)	Fig. 12*d*
xanes donz (50–8738), whirling, lightning around the horizon	
xanes L'y (50–8739)	
nol L	
nol Liz (?)	
nuj nōl Ly (50–8821), chain lightning	
na nel L'y (50–8753), zigzag line	

[1]The numbers in parentheses refer to baskets in the American Museum of Natural History collections.

The round black designs in the centers of bowls are variously interpreted. The term "sun" is often used but again the circle is merely a "center" or "bottom." Sometimes the black patch or circle is ignored altogether in the interpretation. An illustration of the second interpretation is found in Fig. 14*c* which also contains some very common elements in the shape of the cross and crescent borrowed from the White Mountain Apache and about which more will be said later. These are never interpreted in any other sense than as cross and crescent moon. It is odd that the moon in all phases is apparently called *da-hī-ta*^{n} and is invariably depicted as a crescent.

The superimposed diamonds on the sides of the basket are simply called *gō būs* which means diamond figure. The center circle with its points is here given as *di*^{m}*yo xa*$^{\epsilon}$*a* "in the center."

Fig. 14*d* is described as *nit bī L'a nī ta*^{n} "bottom put it" together with the cross *iL na'a* and the crescent moon *da-hī-ta*^{n}. There is one variety of cross seen in the specimens which is derived from a combination of the sun center with truncated triangles (Fig. 19*f*). It is utterly different from the others. Likewise the term for it is different,—*il na wet sōge*, not *iL na*$^{\epsilon}$*a*, the usual name for the simple figure. Each two crosses between the truncated diamonds are interpreted as *iL naga*$^{\epsilon}$ *a*^{n}. In the stem the continuative or reduplicative structure is evidently meant to convey the idea of plurality.

Fig. 14*g* shows the element *gō būs*, "diamond" and a representation of beads, *yo beeza*, which is the circle of checkerwork, as well as "lightning," *nol L.* What could be a more heterogeneous combination of objects? Yet there may be a quite intelligible explanation if we only knew it. Artistically the design forms a whole. This particular specimen is a doubtful San Carlos product, however, not only on account of its material, which is apparently mulberry, and its horizontal zones, (for it is an old basket, and usually this design distribution is found only on new specimens), but the shape also is foreign to the region. The bottom and side walls which merge imperceptibly end in a point in the center, while at the rim the direction changes from almost horizontal to sharply vertical to form an upturned edge.

Only one basket design pictured in Fig. 9 has any interpretation, that of Fig. 9*b*, which is called "the great exodus," which, while vague, gives an idea of traveling animals. Fig. 19*g* shows a blanket design, but that is all that was learned about it, while the maker of Fig. 19*h* said that the pattern meant nothing at all, but was merely intended to look nice.

Fig. 11*a*, shows lightning and trotting coyotes, as well as black triangles called *da tsi dil xil*, "————? black." So many designs are only partially interpreted that one wonders whether the elements not mentioned are there just to fill space or if interpreted would complete tales of even more interesting events than lightning and trotting coyotes suggest.

In the quite modern specimen, Fig. 12*d*, small figures, which are without significance but were copied from a paper seen by the maker, are executed in red. In this design the *nol L ici*, or "lightning all around," is combined with the cross.

The basket in Fig. 22*e*, portrays the sun's rays, ceremonial points and center. Fig. 22*g* is decorated with triangles and cactus plants; Fig. 22*h* again depicts the sun and its rays, while the other criss-cross lines indicate trade.

Horizontal zigzags such as those shown in Fig. 17 at the bases of ollas Fig. 17*b* and 17*c* are frequently interpreted as mountains, clouds, or tipis.

Those baskets decorated with elements that are artistically reconciled into complete designs are those which are least often interpreted.

There are many designs made up of "arrowhead" elements which are sometimes so like the objects they represent that there is no mistaking their meaning. Both these and the half arrowhead seen in Fig. 11*f* are very common on San Carlos baskets. They are rarely interpreted as anything but arrowheads or triangles, just as diamonds are never apparently termed anything but *gō būs* which means diamond figure.

Variations

Little remains to be said on this point beyond what has already been given. Among peoples practising an art in which the entire population or at least all the members of one sex are keenly interested and have been for generations, certain patterns on account of their extreme age are likely sooner or later to lose personal associations or ownership. They are therefore used freely by anyone who admires them, as well as being generally known to all the people by some common term. The lightning, sun, cross, crescent moon, triangle, and diamond patterns belong to this class, although the moon and crescent are by no means as old as the others.

If the custom ever existed of considering certain designs as the property of particular individuals, in the sense in which songs or stories were owned in a number of tribes, it is not now manifested among the San Carlos. The most matter-of-fact attitude prevails regarding the

way in which patterns are copied or varied. The fundamental ideas in the art of the tribe are few and naturally are used over and over again, but the variations of the themes are almost endless as the sketches and photographs indicate. This is particularly true of the zigzag and circle, probably two of the most archaic designs on coiled baskets. They are frequently seen on some of the oldest and most weather-beaten specimens. Fig. 12*i* is an example. This basket was purchased quite a number of years ago from a dealer and no information concerning it was obtainable. It is a fine old piece. Whether it is San Carlos is doubtful, for it has the remains of a braided rim,—a feature which is not San Carlos at the present time and presumably never has been. In other respects the basket is typical and it doubtless was made somewhere in the immediate region. Fig. 14 giving a few old baskets shows some of the more ancient types of decoration. Fig. 14*g* is probably not San Carlos; it is not possible to say just where it belongs. Fig. 14*d* is in all likelihood White Mountain Apache. The vertical and whirling zigzags both appear on old baskets, so do diamonds and triangles on vertical series. The basket pictured in Fig. 14*h* has an odd realistic pattern. On other old specimens one finds the zigzag composed of horizontal and vertical lines like that of Fig. 12*i*. It will be noted that the so-called "sun center" is present in each basket and that in Fig. 12*c* it is quite elaborate.

The various ways of representing the zigzags and sun centers, no matter what interpretations may be given them, are an indication of the ingenuity of the people and could only have resulted from years of basket-making during which the monotony of often repeated designs had to be felt, consciously or unconsciously, and an effort made to relieve it. The faculty of creating so many variations on a single theme can hardly be called a high order of creative imagination for were the San Carlos possessed of more of this, their art would long since have ceased to be confined to the rather narrow limits which it occupies. As it is, their cleverness has saved it from monotony. The series of sun designs (Fig. 27) illustrates the degree of ingenuity involved in their creation. It should be remembered that the San Carlos are only a small band of people numbering 1172 in 1909.

The figures include only the variations to be found in the photographs accompanying this paper. Doubtless there are many others, equally effective. The zigzag variations have not been sketched, for many of them depend for their individuality only on the number of lines, or repetitions, or relative positions as distributed over the bowl. No

one knows the antiquity of the triangle and diamond which have played such a large part in designs. Their arrangement into vertical series or in horizontal bands on burden baskets is undoubtedly very old, while other combinations are found mostly on the newer baskets. Their varieties may be readily observed by glancing through Figs. 24 to 27.

The cross and crescent, as stated before, are not old in the region, at least in basketry decoration, but owe their popularity entirely to a burst of religious zeal of which they were the associated symbols. This frenzy first appeared among the White Mountain Apache owing to a dream experienced by one of their members, in which the adoption of a new religion was urged in order to save the people. The converts adopted these two figures as the symbols and placed them upon every available object. It is said that the greatest excitement occurred about 1903 and at that time the faith was carried farthest abroad, also reaching the San Carlos. There had been some activity of the kind a number of years before that date but it is not known whether the symbols were used then or not. It is hard to believe that many of the baskets bearing these figures are not older than the above date would indicate. Their age-worn appearance is a warning not to regard baskets as extremely old merely because they are discolored or worn. The influence the textile foundation has upon the execution of the design is noteworthy in the case of the crescent which is always necessarily made with square corners. It always lies horizontally with points turned up. The annoyance the square corners must have caused some of the women who preferred more exact delineations is suggested in two White Mountain specimens furnishing apparently the only examples of embroidered designs in Apache basket work, or for that matter, perhaps in the entire Southwest. In one of these the crescent is worked across the face of the coil by means of devil's claw when the background is light and in cottonwood or willow when the background is black. The sewing consists of a single line of back-stitching, which resembles that made on the sewing machine if viewed from the right side only. In the other specimen the crescents were couched on, to use the modern embroidery term. The splint was laid down in crescent form and small stitches taken across it at right angles, just often enough to hold it in place. All of this serves to indicate what a stimulus to technique might be laid at the door of awakened religious zeal or some such circumstance.

The popularity of designs does not seem to be determined by facility of execution, for many common ones present no small difficulties. This is especially true of whorls and of arrangements showing a combination of rhythms.

While the basketry of other regions is also ornamented with designs similar to the lightning zigzag and the sun center, their appearance outside of the San Carlos area is not so frequent, especially in the varied forms in which they occur here. Elsewhere the zigzags are found on baskets of other shapes and are mostly confined to not more than three parallel lines which are always very narrow.

DISTINGUISHING FEATURES OF SAN CARLOS WORK

It has been said that tribes other than the San Carlos use all the materials which they employ in making baskets, that twining and coiling methods are widely known and practised in the Southwest and elsewhere, that other people use a three-rod coil foundation and plain sewed rims. There is nothing unique about the forms or proportions of the objects manufactured; the general arrangements of design elements are not unknown elsewhere, banded burden baskets are found among the Mescalero, bowls and flat ware with all the known arrangements of designs are made at one place or another all over the Southwest. Many San Carlos baskets are decorated only with designs in vogue elsewhere; the same colors, same uses, same water-proofing are equally prevalent among other desert tribes. The bewildered reader may then well ask how a San Carlos basket may be distinguished from one manufactured by almost any other tribe in the region.

No hard and fast rule may be given for identifying San Carlos products, especially for distinguishing them from those of the neighboring White Mountain Apache. And there is no reason why a skilful craftswoman cannot copy almost any basket she sees, which may have been made far away. Fortunately, conservatism, both in technique and design, prevents this to a considerable degree. To be really a connoisseur of this particular art, as of any other, one must know, not only its own characteristics, but those of the baskets of neighboring tribes which can be classed in the same category. And this requires time and study.

In comparing San Carlos work with that of other tribes distinctions are drawn by processes of elimination and combination. These must always be made in connection with the form of the basket.

To begin with the burden basket for example, the Pomo of California and Pima of Southern Arizona manufacture distinctly conical shapes with sharply pointed bases, but Pomo work is distinguished by remarkably even fine twining of a simple diagonal twilled variety in which the stitches are pressed so closely and compactly together that they lie perfectly horizontally and only one warp rod is involved in each stitch. These baskets have no side ribs, but merely a stout rim and are ornamented with brown designs distributed diagonally over the surface. Pima carry-alls are constructed of fiber twine in lace coiling and are suspended in frames of heavy sticks. The Havasupai make burden baskets which in shape are like the Pomo and Pima, but which are twined like the San Carlos ones, with obliquely lying stitches. Only the Mescalero

and White Mountain Apache apparently have burden baskets resembling the San Carlos ones both in shape and technique, but the work of both of these tribes is coarser. The central Apache baskets are only roughly conical; many have rounded and reflexed bases which permit them to stand unsupported on the ground. They are much more loosely worked than Pomo baskets, in diagonal twilled, plain, or three-ply twine.

The Mescalero have the same four side-rib arrangement as the San Carlos and frequently use for their coarser utensils the green yucca leaf, instead of the willow, cottonwood, or mulberry, a material never employed by the San Carlos. This leaf material renders Mescalero baskets lighter and more flexible, while their yellow-green color is very distinctive. Red yucca root splints are sometimes introduced in creating designs. On the other hand, the burden baskets made of the same material as the San Carlos are not as well built, the buckskin fringes are also loaded with rattles made of bits of tin, a sort of decoration not seen on San Carlos specimens. Aside from being slightly more gaudy and crude, these White Mountain Apache burden baskets are not to be distinguished from those of the San Carlos, who, however, manufacture two types, those with side ribs and those without, of which only the former are used for rough work.

Water-proofed ollas are also widely distributed. Tribes near the San Carlos construct coiled specimens, loosely stitched, and fill the interstices with clay, pitch, or mescal juice which, when hard, is white and looks exactly like potter's clay. San Carlos jars are always pitched and are generally rudely shaped. They are nearly always twined coarsely, the rims are very bumpy and are sewed with plain over and over stitching. In rare cases the crude tailor tack or false braid stitch is attempted. It is always poorly done and does not compare in fineness with that produced by any other tribe, so that it seems, if the specimens are really indigenous in the region, that the technique is the result of borrowing and has never been mastered.

The coiled work is notable, first, for the round even coils averaging three to five millimeters in diameter, according to the size of the basket; second, for the three-rod foundation arranged in triangular formation; third, for the splitting of the top rod in sewing; fourth, for the plain-sewed rims where the stitches lie at right angles to the direction of the coil; and fifth, for the general execution of the rims in black. None of these traits is exclusively San Carlos, but the combination may be safely taken as a guide. In form, the bowls are for the most part broad and ample, not very deep, and possess broad, firm bases. They are graceful and

symmetrical. The ollas, while characterized by outlines which are seldom the same for any two specimens, are large, rather profusely decorated and of beautiful, ample, graceful shapes. Their bases are wide and stable.

Even with all the features of decoration which have been so fully discussed carefully borne in mind, it might be possible to confuse the bowl products of the Yuman Palomas, Chemehuevi, White Mountain, and San Carlos which do not adhere strictly to the traditional design distributions. Certain baskets known to have been manufactured by the San Carlos are ornamented with an unusually florid type of decoration and constructed of coarse red or dark willow. Some of these may be seen in Fig. 11, another in Fig. 9*a* and another in Fig. 4. In design they appear to have borrowed from the Palomas, in material it seems that they are unique.

As for ancient baskets, the task of assigning origins is extremely difficult, if not almost impossible of accomplishment. Identification cannot be narrowed to well-defined limits, not only because of the less distinctive and less perfect shapes, but also because of the wear which has obliterated many traces of tribal peculiarities and because of their common decoration by means of simply arranged elements which are widely distributed geographically. Only in certain more general traits can geographical limits be discerned. For instance, three-rod foundations are used in the baskets from California, the cliff-dwellings, the Shoshoni, the Yuman peoples and the Apache. Cat's claw is the typical design material in certain portions of the Southwest but apparently is not traded far. This, combined with willow or cottonwood in a coiled product having a three-rod foundation in triangular formation, excludes California from the likely localities in assigning a place of origin to a basket. Certain design distributions, such as radial, horizontal, and whirling, on bowls, which are the oldest and most widely scattered of the various forms, are confined largely to definite localities. Hence, it is more by "feel," which comes only with acquaintance and study, than by rule that the basket lover may learn to recognize the work of this or any other tribe even if it has journeyed to the other side of the world.

THE INDIVIDUAL CRAFTSWOMAN IN BASKETRY

The standard of workmanship in San Carlos weaving is so high and the work so uniform that sight of the individual maker is completely lost, except in the case of beginners, as far as technique is concerned. However, it must be borne in mind that museum collections are often assembled with an eye to fine or typical specimens and that field surveys may reveal greater diversity of performance. Nevertheless, the individual plays an important part other than that of an artisan in the production of a good basket, in the choice and execution of a design. Her slips are few indeed, considering the complexities of her problem, but it is clear that some problems are harder to meet than others and that some weavers are more clever in solving them satisfactorily. In the discussion which follows attention will be confined to the coiled work, inasmuch as real care in decoration is seldom expended on twined work and the range of decoration is rather limited.

The one unavoidable blemish in all decorated coiled work is the failure of designs to meet on the same coil, after the circuit of the basket is completed. This necessary evil is very cleverly treated by some workers, so that a search is needed to reveal it. At the point of finishing the basket it will be recalled how carefully most weavers pare the foundation down to the vanishing point to avoid the blunt ending of the coil and this assists not a little in concealing the breaks in the design if they are carefully handled. Fig. 13 shows an almost imperceptible graduation.

Fig. 4 is one example of skilful concealment of the spiral construction which would be more evident in the circle around the base were this not executed in checker. At the rim the checker is begun in another part of the circumference from the corresponding point in the central circle. While this may not have been intentional, it does serve to make the beginning and ending of this new band less obvious.

Fig. 17 shows the joining of the spiral design in three of the four ollas. An interesting error may be noted in the first olla, in the series of diamonds near the bottom. In the fourth specimen a hint is given of how the artist distributed her design over a distance a little too small to permit the addition of another figure and too large for what she had planned. In the series of checker triangles at the neck the two triangles farthest to the right have apices created by double rows of black stitches of equal height which tend to broaden them somewhat, but not too apparently, and this is assisted by the repetition of other rows of black stitches between the center and the extremes in the second triangle from

the right. The white diamond at the point of joining in the second decorative band at the bottom is also wider at the top than the others, but considering that no distances are measured, the placing of these designs was rather accurate guessing. On the other hand, observe the discrepancy in size in the checker diamonds of Fig. 16*a*.

The bottom diamond of the olla in Fig. 16*f* betrays wrong calculation on the part of the worker who began a fourth inner diamond and discovered too late that it would not fit without making the design too large.

Some attempts to conceal incorrect spacing may be detected in Fig. 14*a* and *b* where extra sections of zigzag lines have been introduced in places to fill spaces larger than the average, or one has been omitted when the design would appear too crowded.

The more complicated the design the less evident are the errors. Fig. 9*a* illustrates some very bad spacing at the top in the checker section but it is not noticeable at first glance because of the maze of figures. The extra crosses in the outer band Fig. 9*b* betray miscalculation in spacing on what otherwise is a fine example.

Absolutely vertical lines on coiled work are difficult of accomplishment, on account of the slight leftward lean of the stitches as they cover the coil. Fig. 9*c* shows what trouble the maker had with her vertical bands, but the great preponderance of true vertical lines in the majority of baskets is a tribute to the highly developed skill of the weavers.

The sun figure in Fig. 9*d* is uneven, but the further development of the design towards the rim does not appear much out of the way, although actually several discrepancies occur. Fig. 9*e*, it must be admitted, is about as perfect as human hands could make it. The same may be said of Figs. 10*a* and *b*. The design on Fig. 10*c* is uneven, as are the triangles on Fig. 10*f*. Fig. 10*e* is an unusual and remarkable combination of four and five-part designs. The change from two to three outlines of the rectangles as the rim is approached is noteworthy in Fig. 10*d*. The maker began it in the wrong place, in the central rectangle just left of the row of diamonds extending downward and her extra black stitch is there to tell the story.

Fig. 19*e* shows some peculiar errors in the center or possibly some queer symbolism. Judging from the perfection of the remainder of the design and from the fact that when working on the center the woman had hardly progressed far enough to make such a mistake in an absent-minded moment, it is probable that this was intentional. Such peculiarities are rare. The very evident blemish that this center causes would not have escaped the artistic eye of most San Carlos basket makers who probably would censure it.

It is odd that their sense of fitness would not have suggested in such centers as those of Fig. 19*f* and *g*, that the change from black to white should occur at one of the adjacent figures instead of between them.

The center of Fig. 11*a* is unusual in the way in which the concentric rings are joined, presumably an effort to cover the abrupt change of color.

The difficulty encountered in spacing is exemplified in Fig. 12*e* where the "lightning" lines radiating from the center have been straightened again and again. The basket immediately below this is one of the most interesting in the entire collection, as well as one of the most perfect. The puzzling point is the direction of the lightning whorl. In nearly all the other baskets showing this design, from the oldest to the most modern, the whorl follows the direction of coiling and runs to the left. In this specimen, the coiling is anti-clockwise as usual, but the time-honored design takes the opposite direction. Was this an experiment, or a psychological bias comparable to that displayed so often by children learning to print, who write their capital B's, P's, and D's the wrong way around?

Several examples in Fig. 22 show a crowding of the design or an omission of the usual number of parts because of the lack of space.

So the cases of errors in work might be multiplied to many times the number given. It is easy to imagine how they came to be made. In any such work, something is liable to be forgotten until too late, and it is not as easy to rip a basket as it is embroidery, a proceeding often found necessary by European and American women who are supposed commonly to have much more intelligence. The work of the San Carlos woman reminds one of the school drawing experiences during youth, when no erasers were permitted. A mistake once made remained forever a blot and a reproach to a lapse in painstaking care. It would be valuable and interesting to have the criticisms of the San Carlos women on their work and their errors, as well as their explanations and ideas of remedies or expedients for treating what are to them technical or artistic difficulties. This information is of necessity wanting in an objective study of artists and their work.

Whatever may be the artistic faults of execution and combination of designs, or the apparent lack of excuse for associating elements which obviously do not as ornaments "belong" together, (with seemingly wide discrepancies in connected and logical interpretation), it cannot be denied that the San Carlos as a group have a rare eye for balance, distribution, and proportion, as well as for color contrasts, as far as their limited use of color permits. Their work has an appearance of geometricity or mathe-

matical perfection that is noteworthy when it is understood that the calculations for placing designs are made either by eye or by merely the roughest and crudest measurements. Surely this is evidence enough of a high artistic ability, especially when the technical perfection of their work is so generally pronounced.

Even those elements which to our eyes are intrusions in an otherwise perfect design may often be accounted for in a manner at least appealing to the imagination if not to the æsthetic sense, when their presence is explained by their symbolism. All of this leads back once more to the old truth that clarified understanding of motives and causes of the actions of others goes far toward increasing an appreciation of their efforts.

To sum up the position of the individual woman in relation to the products, it is seen that technically, the individual seems to have disappeared. Artistically she is still in evidence. This may in part be accounted for by the fact that the basketry technique has remained unaltered for probably hundreds of years. On the other hand, the art is constantly assuming new forms. Women are continually experimenting with designs, working with the same old elements, it is true, but combining them always into new patterns. Motor habits have long been established for coiling and sewing, which are merely matters of muscle and touch. Design arrangement in its shifting development demands not only a natural gift for visioning patterns and lines, but a strong sense of rhythm which must be continually able to readjust itself to new conditions. Therefore, the individual woman still discloses her personality in her work which would lose half its interest and charm were her imagination and perception standardized as are her muscular movements.

SUGGESTED RECONSTRUCTION OF THE HISTORY OF THE ART

From what the collections reveal, apparently at least three periods have occurred in the development of coiled work in this particular locality. The twined work is probably just as old, but having been employed for rough work has kept it for a long time practically unchanged. The forms it represents are mostly local. No doubt once they were cruder than now; at present (1918) the people are lavishing some of their skill on the production of unusually good examples, showing what they can do when they begin to play with the technique.

Both twining and coiling are evidently very ancient in North America. In the Southwest, as in many other areas, they are found together. It has already been said that the fact that the two are on such different levels of technical perfection even now, and have so little in common, indicates that they came to the San Carlos from different sources. Otherwise the perfection of twining found only in later specimens would probably have been acquired long ago. From the standpoint of mere technique there is no reason why old San Carlos twined baskets should not have been as beautiful as those of some other tribes, particularly when made by people expert in other types of weaving.

Presumably two currents of basketry development met here; the people making coiled ware being the better artisans, took over the cruder twined work, but being unskilled in its technique did little to improve it until stimulated by tourist trade.

The old San Carlos and White Mountain Apache coiled baskets, some of which have found their way to museums, are of the same type as those unearthed in the cliff-dwellings and the pueblo ruins. Possibly the inhabitants of these ancient settlements contributed to the Apache, who came in contact with them during their wide wanderings and raids, captive women who carried with them the knowledge of coiling technique, which developed among the Apache as the years passed, into an art not dreamed of by the Pueblo people. These, on the other hand, may have acquired the technique from California, which today at least, is the center of the finest coiling of the most diverse kinds. But it is equally possible that the three-rod foundation work was known anciently all over the western part of the United States and into British Columbia and that the California and Apache centers are only two where special developments have flourished.

The art of the San Carlos, to judge from the Douglas collection made in the early nineties, passed through a middle stage leading to the present forms. In these specimens of the intermediate period red or dark willow is used entirely, the stitching, as previously described, is coarse but even, and the designs of the most florid character. Whence the impetus came which stimulated the people into developing these ornate designs is uncertain. The only work like it is produced by the Palomas near Yuma on the lower Colorado. Between these gay specimens and the old simple styles apparently no intermediate examples exist, so that it is impossible to tell whether or not the change was sudden. One might rather think them really Yuman. Owing to the habit the people had of burning most of the articles closely associated during life with a person about to be buried, many baskets which might aid in tracing such a development were doubtless lost, as others would be naturally among semi-nomadic peoples whose homes are flimsy. Possibly the baskets of the Douglas collection are the products of one or two persons who had some contact with Yuman work. Many of the specimens do not resemble those from any Apache group known today, as far as arrangement and repetition of elements are concerned.

In the middle period the coiled olla became highly developed. Several specimens on exhibition in the Field Museum, certainly not modern, nor yet of the type represented by the Douglas collection in the American Museum, seem to offer a little uncertain evidence that the White Mountain Apache had a hand in the development of the art in its present form. These ollas have double swells, with only a slight indentation in a central zone and are reported to have come from the Fort Apache Reservation. They were collected by Mr. Charles L. Owen in 1901 and were old when collected. (See Fig. 15.) Their form would suggest that they were copied from the double-globed, twined Apache water jars.

The third and modern type—meaning baskets made until very recently—indicates a return to old and chaste designs with here and there the introduction of new elements. See Figs. 9*e*, 10, 12*b* and *d* and 19. The workmanship is much finer than any seen on pieces belonging to earlier periods while the accurate placing of many complicated arrangements one within the other, on bowls, is added proof of more highly developed skill.

Still another period, represented by ultra-modern work, shows a branching out from the habitual radial arrangement of designs on bowls to occasional distributions in horizontal zones. A number of new forms appear, especially oval flat baskets with lids, and new design elements in

the shape of human figures. The animal forms appeared frequently on the florid types of the Douglas group and it is on one of these baskets that the peculiar double coiling was found which is mentioned in the section on Technique (p. 161).

Until more is known, it seems best to consider the specimens of the florid period to have been the work of a few individuals rather than the whole tribe, so like an intrusion on tribal custom do they seem to be. It would be much easier to account in that way for the simpler designs on modern work, which seem otherwise to be a reversion to old types. Without this peculiar group the sequence of development from old to new would be fairly normal in technique and designs.

Fig. 18 illustrating the outlines of forms of bowls indicates that many old specimens were straighter walled and deeper than the modern. Among them are shapes with unstable bottoms, none of which are to be found in modern products. The old straight or incurving walls and narrow bases were probably suggested from foreign sources, possibly from the Pima. The change from deeper, smaller bowls to those of shallower, broader outlines is somewhat significant, as is the change from the use of mulberry to the almost exclusive employment of cottonwood and willow. A wider investigation of other Southwest basketry might throw more light on the direct influences causing the change from what was once a widespread simple art to highly specialized forms, which has occurred in various centers of the Southwest.

SAN CARLOS ART COMPARED TO THAT OF OTHER SOUTHWESTERN GROUPS

Before leaving the subject, it might not be amiss to attempt to assign San Carlos art a place in that of the Southwest region as a whole, from the viewpoint of relationships as well as of excellence.

The California area, deservedly famous for its remarkable achievements in many varieties of weave, is probably in some way connected with the appearance of three-rod coiling throughout the region east of it in the Great Rocky Mountain basin, but excluding it, coiled basketry rose to high eminence in several places in the Southwest. Local ideas, developed upon the common technique of simple coiling with similar materials, thrived and gave their own characteristics to baskets of these centers.

One center is located among the Chemehuevi, another among the Palomas, and a third in the San Carlos–White Mountain region. Their products are quite similar in shapes, coil formation and size, as well as materials. No one of them is better than another, apparently, in quality of output. In quantity production possibly the San Carlos–White Mountain Apache leads.

Outside of these three centers, the art of which is so striking, the Pima and Papago produce work equally arresting. In fact, it probably surpasses that of the others. But a different type of coiling, even though identical materials are employed, is sufficient to prevent its being classed with the three-rod type did not the versatility of the Pima and Papago in handling many different weaves unknown to the northern tribes link their work with that of peoples farther south.

Many other tribes, Yuma, Shoshoni, etc., manufacture baskets of both twined and coiled varieties as well as less conspicuous articles in plaited and lattice weave, but none except the Jicarilla Apache in northern New Mexico, whose totally different work should be separately studied, have created an industry like that marking the three centers mentioned. The Mescalero, Ute and Navajo, while using three-rod foundations, make much coarser baskets also different in materials and colors. Navajo and Mescalero patterns on the whole are pale and the designs executed are simple, even crude. The false braid rim finish is one outstanding feature always beautifully made. Amid all these San Carlos coiled work takes its comparatively humble place. It has not the exquisite fineness of texture of some Californian products, though for what it is, it is excellently made. Nor is it as beautiful in design as Pima and

Papago work. In its own general region it is one of the three conspicuous types of three-rod coiled work.

While basket making is no longer pursued in order to provide utensils for the household, except for making the always useful burden basket, the art of basket making will not decline if an enlightened tourist trade will demand the best efforts.

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